THE IRON AGE

New York, March 20, 1919

ESTABLISHED 1855 VOL. 103 : No. 12

The Practical Analysis of Molding Sand

Selection According to Physical Qualities and the Nature of the Work —Sieve Tests—The Perfect Sand

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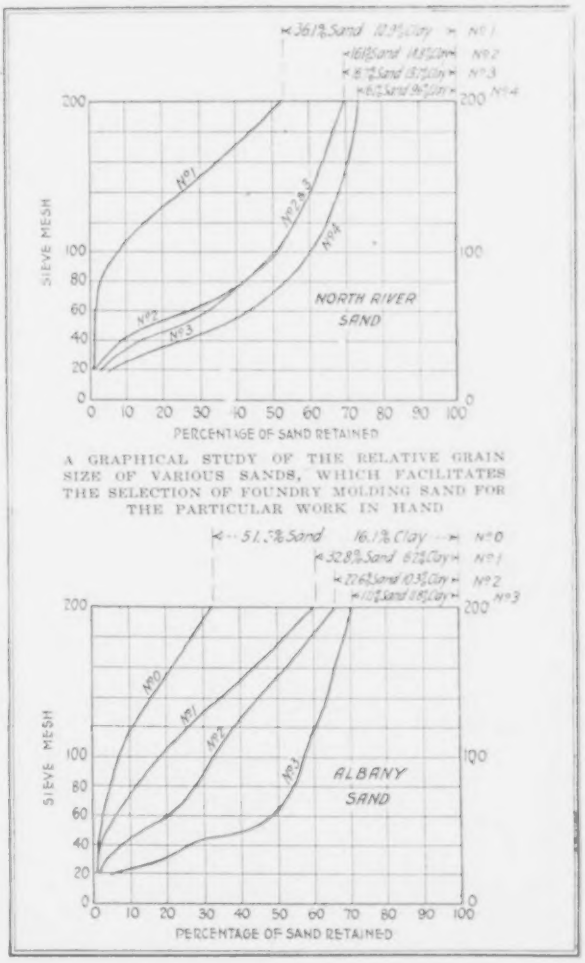
WHEN Pharaoh's taskmasters deprived the enslaved Israelites of the straw used in making bricks, it was evidence of the king's "crabby" disposition; but also it affords Biblical proof that even in ancient days there was appreciation of the difficulty of making molded sand and clay retain its shape.

The "bond of sand" has since become a subject the mention of which causes the majority of foundry men to wave their hands and emit sounds more or less derogatory or commendatory, as they happen to feel about the case. In the foundry, sand has many uses—a trite statement, it is true—but not the least of such, and possibly one of the most important, is its use as a complete and perfect alibi for poor work.

Executives, together with progressive founders, who have tired of this excuse, realize the vital importance of proper sand, and while much has already been said, the subject deserves reiteration, and the results of actual experience are of value.



A GRAPHICAL STUDY OF THE RELATIVE GRAIN SIZE OF VARIOUS SANDS, WHICH FACILITATES THE SELECTION OF FOUNDRY MOLDING SAND FOR THE PARTICULAR WORK IN HAND

Origin

Any sand is not suitable for green sand mold—certain very definite qualities are requisite. It has been my privilege to see a few men who could feel of sand and instantly determine its foundry availability, but few are endowed with such discernment, and therefore there have been developed other methods somewhat more scientific for the determination of the qualifications of sand. Inasmuch as the qualities of the sand are dependent on the origin, a consideration of this subject is enlightening. Nature has stored up vast quantities of sand in beds formed through the decomposition and disintegration caused by the weathering of granite or similar igneous rocks. Thus we are back to the early periods of structural geology, for such rocks were the first to be formed and are the parent substance from which other rocks and sand are formed. The original granite consisted of quartz, feldspar, and mica or hornblend. By the action of frost, water, and similar natural agencies, the feldspar has become wholly or partly decomposed, and formed clay. The quartz grains are chemically unaltered while the mica and hornblend are usually wholly decomposed. The decomposition product is, then, a sand consisting of quartz grains occasionally mixed with mica both partially or wholly covered with clay. It is apparent that the properties of sand will vary tremendously, depending on the violence and extent of the weathering process. An ideal molding sand would necessarily be a synthetic product. Dr. Richard Moldenke states in his admirable volume, "The Principles of Iron Founding," that his definition of an ideal molding sand is one consisting of uniform-sized, rounded grains of silica, each grain evenly coated with the thinnest necessary layer of the most refractory and fattest clay to be had. This is a theoretical ideal, but it is an undoubted aid in the comparison of actual sands, and helps to arrive at certain qualities which sand must possess to be suitable for green sand molds.

Proper Requirements

A mold when made up must be sufficiently rigid and strong to confine the molten metal to the exact limits of the mold without alteration in shape; it

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must allow the steam and gases to escape readily; and it must resist the fusing action of the liquid metal. These three major requirements may be further subdivided as follows:

(a) Rigidity.
  Bond of clay.
  Size, and shape of grain.
(b) Permeability.
  Porosity.
  Quantity of clay.
  Size and shape of grain.
(c) Refractoriness.
  Quality of clay.
  Quantity of clay.
  Size of grain.

Rigidity and Bond

This ability of molding sand to resist strain after forming is dependent on the shape of the sand grains, and also bears a very close relation with the bond of sand. It is apparent that sharp, angular and flat-sided grains will interlock and form a stronger mold than rounded grains, but unfortunately such interlocking seriously reduces the facile escape of gases. It is also a fact that ramming of such sand produces a less evenly packed mold than do round grains, due to the more perfect distribution in all directions of the force of the rammer by the latter shape. This quality is also intimately connected with the amount of tempering water used, the proper amount of which is determined by the quantity and condition of the clay. Rigidity should be secured by the bond of the clay rather than by dependence upon sharp sand.

The power of clay to stick the grains of sand together depends on its content of fatty or sticky clay. The formation of the clay has been effected by the decomposition of the feldspar which consists of silicates of aluminum and the alkalis contained in the original granite. Through weathering, the aluminum silicates have taken up water in chemical combination and to greater or less extent the other silicates have been decomposed and washed away in solution. The more completely the formation of the hydrated aluminum silicate, the greater the bonding power of the clay, for it is this constituent which is naturally sticky. Thus a sand containing a small percentage of fat clay may have as good a bonding power as one containing a large amount of poor clay. The necessity of sufficient bond in the new sand is well understood, but it is too frequently the case that the floor sands receive very little attention in maintaining the bond within the necessary limits. The fatness of the clay is destroyed by contact with the hot iron in the molds, and care should be exercised in shaking out the castings to see that the minimum of burned sand is returned to the pile.

Permeability and Porosity

Porosity is the term applied to the spaces existing between individual grains of sand. The proper venting of sand, or the ease with which steam generated from contact with the molten iron with the mold or gas liberated at the moment of setting can escape through the mold is dependent not alone on the porosity but also the permeability. This can be described as the shortest linear distance through the pore spaces between the grains from one side of a unit volume of sand to the other. That is, a sand may be porous but because of the shape and size of the grains, there may be no communication between adjacent pore spaces, and therefore it is not permeable because gas endeavoring to escape cannot find a free passage through the sand. Here again the tempering water and amount of clay are important. It is obvious that a large clay content will tend to fill the pore spaces and diminish the venting qualities. Each additional quantity of water also tends to reduce the permeability. It also markedly affects the bond and consequent rigidity, and, as already noted, it is essential that the tempering of sand be carefully controlled. Experiments reported in THE IRON AGE, vol. 94, pp. 544-6, indicate that 4 per cent of water is the average requirement to give maximum strength, and that increasing the tempering water 50 per cent decreases the strength 35 per cent. Dr. Moldenke also shows the same tendency with the exception of fine sand where "the higher water averages seem to serve best, which is natural when the greater surface areas to be covered are considered."

A series of water tests were made from several floors on which the same sand was used and the same general class of work was molded. All the sand was mixed by a sand cutter, but the individual molder tempered his own sand. This was explained by the superintendent, who said that each molder rammed the sand to different densities and so was allowed to moisten the sand to an extent that was satisfactory to him. In view of this, the following results are interesting, and form a valuable instance of the necessity of elimination of the personal element and the standardization of processes:

Per Cent Moisture

Pile Number	1	3	3	4	5	6	6	8
First day	4.79	4.14	5.18	5.58	5.63	6.11	6.45	5.13
Fifth day	5.41	7.14	6.07	5.93	4.82	5.94	6.46	6.78
Tenth day	4.20	7.91	6.47	7.06				

Note the minimum is 4.14 per cent and the maximum 7.91 per cent. Unfortunately for the superintendent's explanation, the maximum and minimum happened to be with the same molder. It is obvious that uniform results cannot be expected when it is considered that the higher percentage, as well as reducing the bond and consequently the rigidity, decreased permeability and also increased the setting rate of the casting.

Refractoriness

The ease with which a mold is broken down after use and the damaged sand is reclaimed is largely dependent upon the quantity of fluxing material in the molding sand, and therefore is closely related to refractoriness. The silica of sand is practically unfusible while the fat clay and aluminum silicate will be unchanged by the heat of molten iron except at the inner mold surface. The residual mica and silicates of the alkalis fuse at very much lower temperatures and also form fluxing materials. Therefore the admixture of these alkali silicates not only reduces permeability but may also reduce the fusing point of the mixture so that cutting of the mold takes place with excessive loss of sand and poor casting surfaces. The fusing points of the various silicates are as follows: Of aluminum 4350 deg. fahr., magnesium 3960 deg. fahr., calcium 3810 deg. fahr., iron 3270 deg. fahr., sodium (alkali) 1500 deg. fahr.

Examination of this table shows that the presence of the alkali silicates will cause sintering and sticking of the metal to the mold, and also cause further loss of sand by the more ready penetration of the heat into the molds. A very excellent check on this factor is the determination of the amount of sand used per ton of castings of a given classification. This figure varies a great deal in foundries.

showing that either the sand is deficient or the practice is poor.

The grain size of the sand necessarily bears a relation to the size of the casting poured. A small casting can take a fine sand, as there is little venting required, but on the larger castings, smoothness of the surface must be subordinated to venting, and therefore a sand with larger grain size must be used.

The analytical methods of determining the forging points are of interest, but it is not the purpose to discuss them here. It will suffice to state that the so-called "rational analysis" in connection with sizing test and possibly microscopic examination furnishes practical information for the foundry. A rational analysis reports the percentage of clay, quartz, and feldspar, and the relative fatness or bond of the clay, together with a sizing test. The use of specification in the purchase of sand is practical, while the floor sand can be best kept up by chemical tests. The following samples are representative of two well-known brands and were actually used in a large foundry.

Analysis of Sands, Dry Basis

Name	North River No. 1	North River No. 2	North River No. 3	North River No. 4	Albany No. 0	Albany No. 1	Albany No. 2	Albany No. 3
Chemical Analysis:								
Clay	10.9	14.8	13.2	9.6	16.1	6.2	10.3	11.8
Quartz	69.5	60.4	58.4	72.4	71.9	77.6	72.3	70.9
Feldspar	19.5	24.8	28.4	18.0	12.0	16.0	17.4	17.4
Iron oxide	6.7	8.5	9.8	6.2	4.1	5.5	6.0	6.0
Alumina	2.1	3.0	3.4	2.6	2.3	3.5	3.0	2.4
Physical test:								
20 mesh	0.2	1.0	3.7	5.2	0.4	0.4	1.0	4.9
40 mesh	0.6	6.5	9.9	19.1	0.8	1.3	6.5	22.0
60 mesh	0.6	22.2	16.6	23.1	1.4	5.0	12.7	22.1
80 mesh	1.9	10.7	14.1	8.5	2.6	7.1	8.0	5.8
100 mesh	3.1	8.0	6.0	4.9	1.9	5.7	5.3	2.4
200 mesh	46.6	20.6	19.8	13.5	25.3	41.5	32.6	13.9
200 mesh	36.1	16.1	16.7	16.1	51.5	32.8	23.6	17.1
Bonding value	81.0	77.0	64.0	46.0	77.0	92.0	24.0	42.0
Moisture as received	10.5	6.5	9.1	7.3	8.6	8.2	7.8	10.0

Method of Selection

From the information supplied by these analyses, we must draw conclusions as to which is the sand best adapted to the purpose. The size of the casting will immediately determine the grain size, and this is indicated by the sieve tests. Having once selected the proper size of sand, it is then desirable to choose the one that will give the most rigid mold with greatest permeability and ability to stand the cutting action of the hot iron. A very interesting point is afforded by comparison of the relative bonds of the two No. 1 sands. The Albany has the least clay but the highest relative bond, and other things being equal would be the most satisfactory sand. This must not be construed as a general statement regarding the relative values of these two well-known brands inasmuch as sand banks and shipments will vary considerably. As already noted, the larger the casting, using a green sand in the mold, the coarser the grain size needed. It is far better to have a uniform grain size and the perfect sand would have rounded grains of the same size, thus allowing the maximum venting. The admixture of large percentages of different sized grains tends to packing and filling the voids with smaller particles. The practice of mixing No. 1 and No. 2 or No. 2 and No. 3 sand cannot be too severely condemned as the only advantage derived is the greater rigidity of the mold gained by sacrificing the superior venting qualities of the uniform sized sand. A sieve test will rapidly grade the sand and these have been reported.

Explanation of Curves

the sands. The accompanying curves are found by plotting the percentage of sand that will be retained by a given mesh. The perfect sand would be a straight line parallel with the abscissa, and the nearer this condition is approached, the better the sand. Practically a sand never gains the ideal, but the graph affords very ready comparison. Many founders can grade sand to a certain extent by feel, but the writer has seen many instances of false judgment on the part of experienced men. For instance, the same sample of sand presented at two different times was graded as 1 and 2. Reference to the curves gives explanation, as the No. 1 and No. 2 sands are very similar; but the decision as rendered determined the use on certain floors.

It is natural that the same sand bank should vary considerably in itself, which makes it the more important that carloads should be tested and placed in the proper storage bins or piles. A comparison of three No. 1 sands received at several month intervals is given as follows:

Analysis of Three No. 1 Sands, Dry Basis

Chemical Analysis:			
Clay	7.6	6.2	7.8
Quartz	72.2	77.6	69.1
Feldspar	20.4	16.0	23.0
Iron oxide	3.2	5.5	4.5
Alumina	7.0	3.5	7.9
Physical Tests:			
Mesh			
20	0.1	0.4	0.1
40	0.2	1.3	0.2
60	0.3	5.0	0.4
80	2.4	7.1	3.0
100	5.7	5.7	4.9
200	54.5	41.5	53.3
200	28.4	32.8	30.1
Bonding value	66.0	92.0	47.0
Moisture as received	0.9	8.2	0.7

These three are very close, and while it may be generally true that such agreement is secured, there are sufficient exceptions to make careful examinations very desirable.

Dr. Moldenke has published the variation of American sand as:

	Range	Grade Average	Ideal Average
Quartz	58.82—81.38	65.53	84.0
Clay sub.	15.49—24.36	21.73	13.50
Feldspar	3.13—22.16	12.74	2.50

The most serious losses of a foundry are often caused by sand, either by improper use of good sands or by sand actually deficient in quality. Opinion varies radically among founders from casual examination. One will say a sand is useless, another with the same years of experience behind him will declare the sand the finest ever seen. Both can prove a fair case when they give their personal attention to the affair, all of which shows that manipulation is a considerable factor. But such supervision is not given and cannot be given to every molder and every case. We have to deal with practical conditions and available labor.

Precautions

Sand must be standardized as far as practicable method of use made uniform, and the quality of the floor sand carefully kept between definite limits. It is necessary that the bond of the floor sand be kept as low as is commensurate with good work, because constant exceeding of that point indicates undue use of new sand and therefore unnecessary expense. If the bond falls too low, drops, runouts, and other trouble will occur. The logical method of keeping down loss from sand is first to determine what sands are needed, then to buy them under specifications, test the quality of that received, and maintain the quality of floor sand by suitable tests.

A brief analysis of the War Revenue bill, known as the House of Representatives bill 12863, with particular reference to its effect upon industry, has been issued by the National Industrial Conference Board, 15 Beacon Street, Boston.

GREAT ORE POSSIBILITIES

D. E. Woodbridge Addresses Tax Committee of the Minnesota Legislature

In a recent address before the Tax Committee of the House of Representatives of the State of Minnesota, in connection with pending bills providing for tonnage taxes on the mining companies of the state, Dwight E. Woodbridge, mining engineer of Duluth, reviewed at some length mining conditions throughout the world. Early in his address he sought to disabuse the minds of his hearers of the idea that there is nothing like the Mesaba range; that there are no other districts to compete with it. "We are very wrong," said Mr. Woodbridge. "France alone has recovered from Germany in the past few months as much ore as there is in Minnesota." He said that the incident of the construction of the first blast furnace in Pittsburgh in the year 1869, emphasizing the drift of the markets from the Atlantic Coast to the interior, is the incident to which is due the pre-eminence of Minnesota in iron ore. Under present conditions, it is cheaper to bring ore to Pittsburgh from the Great Lakes than from the Atlantic. That is the secret of the development of Minnesota.

Mr. Woodbridge referred to the great known iron ore districts in the world, naming them in their order of size as follows: Brazil, Newfoundland, Eastern France, including Lorraine and Luxembourg, Lake Superior, Northern Sweden, Eastern Cuba, Alabama-Georgia district, the New York, New Jersey territory, and he added perhaps a ninth in Norwegian Lapland north from the Arctic Circle around to the White Sea. All of these are competitive, as to anything more than mere local and provincial business.

"It is a curious but none the less indisputable fact," said Mr. Woodbridge, "that nature seems to have equalized the advantages and disadvantages of most of these great districts, so that almost every one of them, whether it contain high grade ore or low, whether it is separated from markets by long distances or by short, whether it is on all water transportation or on rail—can compete on fairly even terms with each of the others, at naturally competitive points. This equality is so close that any added burden, however slight, put on one field, may be too much for it to overcome."

Predicts New Steel Center

Mr. Woodbridge expressed his opinion that the influence of the Panama Canal must raise at some point on the Gulf of Mexico, say at Mobile or Pensacola, one of the great centers of iron manufacture and export.

Mr. Woodbridge said he did not think the Steel Corporation would be so seriously affected by additional tax burdens as would the individual operator, the local Minnesota man who is developing small properties. Some of the operators would be so handicapped by additional taxation that they would be compelled to go out of business.

Comparing mining activities of three states in the Lake Superior region, Mr. Woodbridge said he knew of half a dozen drilling campaigns under way now in Michigan and Wisconsin, and in this search for ore more than a million dollars is being spent. "I know of one large company in New York State," added Mr. Woodbridge, "that is arranging to bore six miles of holes in its ore beds preparatory to extension of its mining operation; I do not know of one drill working in Minnesota in a search for ore bodies. These facts carry their plain lesson, gentlemen. The iron ore people are struggling against the imposition of a principle of taxation false in theory and vicious in practice, and they know that any tonnage tax bill, however gentle and mild it may seem, is but the entering wedge for a constantly growing series of tax bills, each one worse than that before, which they can see following each other down the vista of the coming years."

Billions of Tons of Waste Rock

Mr. Woodbridge referred to the experiment carried on for some time on lean magnetites of northern Minnesota, as briefly described on page 50 of THE IRON AGE of Jan. 2, 1919. He said that he and his associates in these experiments are confident of success, and are now making plans for the construction of works that will cost several million dollars to prove that billions of tons of waste rock are of value and will be the basis of an industry that will pay billions of dollars to labor in Minnesota. "The tonnage that this experiment adds to the resources of our state is far greater than I dared think two years ago," said Mr. Woodbridge, who then quoted from a speech by Judge Gary, in which he referred to billions of tons of iron ore in Minnesota, which is not now considered of any value but some day will be very valuable.

"I beg of you," pleaded Mr. Woodbridge, "that no unfriendly and ill considered legislation shall stop or long defer an enterprise that means more to the State and to its future generations than any development that has ever knocked at its doors."

Minnesota Experiment Station Studying Ore Concentration

Realizing that the present grade of merchantable Lake Superior ore will be exhausted in a little over 30 years, the Mines Experiment Station, run by the State of Minnesota in connection with the School of Mines of the State University, is working on methods for the practical handling of poorer ores along with the good, as is set forth in a 12-page pamphlet for February, 1919, received from the school. In the report of J. R. Finlay to State Auditor Preus of Minnesota the following statement appears: "If the 'iron formation' is to be considered an ore, there is enough ore in the Lake Superior region to last the world 1000 years."

The Minnesotans feel that unless this potential reserve is properly developed, the furnaces at or near the seaboard will naturally look to Cuba, Newfoundland, South America and the European continent for their ore supply, with an attendant wane of the Lake Superior business. According to a report of the United States Geological Survey there are "thirty billion tons of ore bearing material in the Mesaba range alone containing 35 per cent iron. If this material were to be concentrated, it would produce twenty billion tons of merchantable product and at a production rate of 30,000,000 tons of concentrate per year this ore material would last 600 years."

According to the pamphlet: "The possibility of concentrating the sandy western Mesaba ores and the magnetic eastern Mesaba ores has been demonstrated, not only experimentally but also in large continuously-operating plants." Again, "Mechanical concentration of this low grade material will remove part of the silica and phosphorus and agglomeration may remove part of the oxygen and perform certain other chemical reactions that now take place in the blast furnace. In this event the decreased cost of smelting this concentrate may more than compensate for the cost of producing it from low grade ore."

The German Pig-Iron Output in 1918

Statistics of the total German pig-iron output in 1918 are now available. In THE IRON AGE, Feb. 27, only those for the first 10 months were published. The November and December output last year was 516,570 tons and 430,478 tons respectively, making the total for the year 11,754,542 metric tons. The following table gives the output in metric tons during the war as compared with that of 1913:

Year	Total	Year	Total
1913	19,309,173	1916	13,284,738
1914	14,389,547	1917	13,142,278
1915	11,791,199	1918	11,754,542

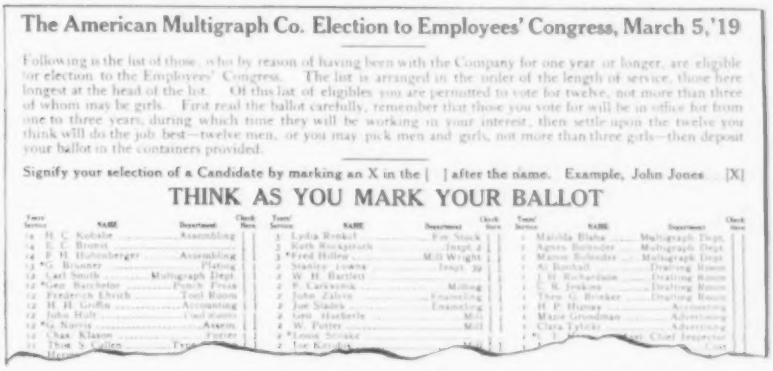
The production fell from 1,609,098 tons per month before the war, or in 1913, to 979,545 tons per month in 1918.

By decree of the Superior Court in the State of California the name Advance Machine Co. is changed to Los Angeles Valve & Fittings Co.

Democracy Applied to Shop Management

American Form of Government Used as Model of New System Adopted by American Multigraph Co.—Congress Elected by Employees

A form of shop organization designed to provide co-operative management and to create machinery from which employees are empowered to propose changes or improvement in conditions or any other matter affecting the relations of the company with its workers has been adopted by the American Multigraph Co., Cleveland. The organization has been formed under the democratic principles of the national Government and with a view of providing an effective and unbroken contact between the management and its employees.



The American Multigraph Co. Election to Employees' Congress, March 5,'19

Following is the list of those, who by reason of having been with the Company for one year or longer, are eligible for election to the Employees' Congress. The list is arranged in the order of the length of service, those here longest at the head of the list. Of this list of eligibles you are permitted to vote for twelve, not more than three of whom may be girls. First read the ballot carefully, remember that those you vote for will be in office for from one to three years, during which time they will be working in your interest; then settle upon the twelve you think will do the job best—twelve men, or you may pick men and girls, not more than three girls—then deposit your ballot in the containers provided.

Signify your selection of a Candidate by marking an X in the [ ] after the name. Example, John Jones [X]

THINK AS YOU MARK YOUR BALLOT

The Original from Which This Was Reproduced Was 9 x 16 In. in Size and Contained No Less Than 310 Names

The new links in the regular organization that forms the means of contact between the employees and executives consist of a congress composed of 24 employees and a senate made up of department heads. Twelve of the members of the congress are to be elected by popular vote. The right to vote candidates for the employees' congress is bestowed equally on male and female employees, the only restriction being that a voter must have been on the company's pay roll 60 days before election. The three congressmen elected by the highest number of votes are to confer with the president of the company on the selection of the other twelve members. In making these twelve appointments the three congressmen comprising the committee, and the president act jointly. Elected and appointed members of the congress are all on the same basis.

No person is eligible to candidacy for a congressman who has not been an employee of the company for one year or longer, who is not a citizen of the United States, or who is not of age. Equal rights to serve on the congress shall be held by both the male and female employees, although at no time shall the proportion of female members to male members exceed the ratio of one to four. The total number of employees at present is approximately 1300, about 500 of whom are female. Departmental lines are not drawn in the selection of the members of congress.

In each of the 45 departments an employee will be appointed by the congress to present any matter that his department wishes taken before the congress and to interpret rulings of the congress to those in his department. These representatives will not have a vote in the congress, but will have the right to appear before any committee of the congress. The congress will be split up in numerous committees and the matters as presented will be taken by the committee before the congress as a whole. For the better handling of suggestions pertaining to all phases of management directly affecting the employees, the committees will be charged with responsibility in all matters relating to their particular subject. These committees will deal with such subjects as employment and discharge; education and publications; health, sanitation and safety; wages and rates; economies and suggestions; rules, procedure and elections; shop training; sales co-operation; and recreation, athletics and entertainment. Other committees will be added as needed.

The congress will meet regularly once a month, although special meetings will be held when desired. On the meeting nights the company will serve dinner without cost to the members and after dinner the business session will be held. The committees of the congress will meet as frequently as necessary. The employees' congress will elect one of its own members as chairman.

The senate will consist of the following individuals, who by reason of their position, are responsible for carrying out the company's policies and ideas of management: production manager, chief engineer, superintendent, advertising manager, sales director, treasurer, chief inventor, chief inspector, manager industrial relations, purchasing agent, auditor, vice-president and the managers of such other departments or divisions as may be established from time to time. R. G. A. Phillips, vice-president, is designated as chairman of the senate.

The senate will work with the employees' congress in the preparation of such measures as affects the company's policy. The employees' congress has the power of originating all legislation directly affecting the relations of the company, its executives and employees. Such legislation as receives the approval of the congress shall then be passed to the senate for its approval. It will be the duty of the senate either to approve or disapprove the action of the employees congress. In the event of an approval the chairman will indorse the measure as approved and pass it to the secretary of the company for the purpose of receiving the approval of either the cabinet or the board of directors before the measure becomes a regulation. The cabinet is composed of the president, vice-president and treasurer. In the event of a disapproval the senate will return the vetoed measure to the employees congress, together with written recommendations for such changes as will make a measure acceptable. Approval of the senate shall constitute indorsement only, the final approval of the board of directors or the president and his cabinet being necessary to put any approval measure into effect.

A plan of arbitration is provided in the event the employees congress and the senate shall be unable to agree on any measure. In that case the chairman of the respective bodies shall each appoint three members to act as a joint committee for the purpose of bringing the debated measure to such form as will be acceptable to both bodies.

Any measure which may have successfully passed the various bodies and shall have received the approval either of the board of directors or the president and his cabinet becomes a company policy. For the purpose of keeping all employees in touch with such new regulations special bulletin boards will be maintained in the various departments on which will be posted such new regulations. In addition, the matters acted upon will be given publicity in the company's house organ.

Provision is made for a supreme court for the purpose of acting as a court of appeals or to interpret the articles that are provided for the new form of management. This court will consist of three members of the employees congress and three members of the senate and the three members of the president's cabinet. The majority vote of this supreme court will carry with it its indorsement of any matter that comes before it.

Either the congress or the senate may impeach one of its members. To obtain a conviction it shall be necessary that two-thirds of the members shall concur in the verdict. Conviction carries with it only expulsion from office, although the person expelled shall be required to show why his conduct is not grounds for dismissal from the company.

Thomas Wright, manager of the industrial relations of the company, is secretary of both the congress and the senate and will look after the meetings and keep the minutes.

The company has adopted this plan with the belief that the employees are entitled to something more than their wages; that they have brains which are capable of working out problems that come up; that their latent abilities should be developed so that they will give the skill of their brains as well as of their hands; that they will realize that they are part of an organization formed to manufacture and sell goods, and that they will see more clearly the need of doing good workmanship and of turning out good products. The company believes that its industrial management plan will make their employees more contented, give them a broader knowledge of the business and a truer view of the relationship of their jobs to the ultimate consumer.

Preparing for the Plan

In preparing this plan of management, the company is organized from the bottom up instead of from the top down. It points out that under the latter plan employees are sometimes put on the board of directors of a company, but these boards give little attention to the various details of production and management which affects the employees. In working out the plan it was the purpose to break down departmental lines in plant organization and to make the employees feel that all are working in one big organization, and at the same time providing machinery for looking after the different departments through the congress. In a booklet bearing the title: "Multigraph Industrial Democracy," the company set forth its plan in complete form, except various details that will gradually be worked out. The general purpose is outlined in a preamble, a portion of which is as follows:

"In setting forth upon this new idea, but one thought has been uppermost in our minds—to give so far as possible to each employee, regardless of position, a speedy and convenient means of making his thoughts and opinions known. In other words, to create machinery, whereby all employees, through their representative bodies, may suggest to the management changes or improvements in conditions and regulations directly affecting their relations with the company; by this means working with the management the same as the stockholders now work through their representative bodies—the board of directors and the active executives.

"We believe that the plan as proposed and outlined should help us solve the difficulties arising in our industrial life. We believe that the means provided will restore to industry that intimate touch of management with employees which has become almost impossible to maintain in modern business due to the large units with which we work.

"By this plan we believe that the management may be kept in close personal touch with all these elements, which, when working together in complete co-operation and harmony, will enable the company to serve the business world with our products with greater efficiency and increased benefits to all concerned."

The method adopted for "selling" the plan to employees was interesting. The president, H. C. Osborn, sent to each employee, so that it would reach him in the mail Saturday morning, a copy of the booklet accompanied by the following letter, explaining the purpose of the plan of industrial democracy as a basis of management:

> I hope you will find time between now and Monday to give the inclosed booklet a careful reading. That's the one big reason why I'm sending it to your home.
>
> The new idea described in the booklet is worthy of your best thought. Talk about it to your friends and family—and when you come in Monday morning I will consider it a big favor if you'll come to my office and tell me whether or not you think we're on the right track.
>
> Will you do that?
>
> From now on, you will be urged to use your brain in working out our problems, just as you are asked to use your hands in producing the work.
>
> It means the beginning of industrial democracy, as a basis of management, in the American Multigraph Co. Through the representation provided, your thoughts and suggestions will be considered in the laying out of company policies and regulations.
>
> We expect the plan to produce great things. It will mean progress and benefits to us all. Of course, it is going to add to our responsibilities, too—especially for the representatives and those who are elected to congress—but the honor will be worth the extra effort.
>
> To me it represents an idea that has taken us many years to work out. I hope it will mean that we can work with greater co-operation and added efficiency.
>
> The biggest result to wish for is contentment. If, through the workings of this plan, cheerfulness and good will towards others can be multiplied, then we need have no fears for the success of industrial democracy in our plant.
>
> Just now I want your support. If you think the idea a good one, say so, and then pledge yourself to help it make good!

Complying with Mr. Osborn's request that his employees come to his office and talk the plan over with him, about 85 per cent of the employees visited his office singly and in groups. He spent three days in talking over the plan with them. The majority appeared to be in favor of the plan, although a few were skeptical. However, nearly all of the latter were convinced before they left the president's office. Each employee was given a pledge card to fill out, pledging his support of the

plan, and nearly every employee has since signed these cards.

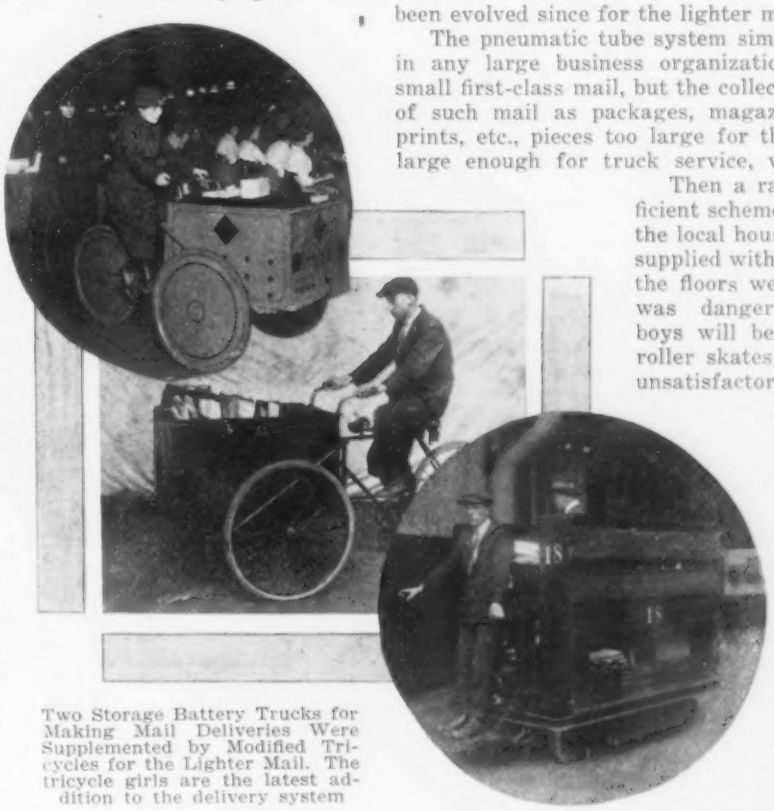
Following the conference between the president and his employees an election of members of the congress was held the following Wednesday, March 5, and 1220 votes were cast, there being about 150 not voting because of absence or not being eligible to vote. An official ballot was printed containing the names of every employee who was eligible to election. A lively campaign was conducted among the employees, and various shop restrictions were temporarily removed so that stump speeches could be made and campaign work carried on during the rest periods and lunch hour. Foremen were on exactly the same basis as employees and the most popular candidates won the election.

Out of the 12 elected, two were foremen. Out of the 12 later appointed to complete the congress, four were foremen. Of the 24 chosen by election or appointment, three are girls. The preference of the latter seemed to be for men rather than to have members of their own sex represent them. Four members of the congress were elected for 3 years, four for 2 years, and four for one year. Hereafter at the annual elections members will be chosen for 3 years and the terms of one-third of the members will expire each year. Hereafter, instead of having the large ballot containing the names of all who are eligible for election it is planned to have a general primary at which each department will name two candidates, so that there will be approximately 100 names to choose from.

NOVEL MAIL DELIVERY SYSTEM

Rapid and Efficient Service Developed by the Westinghouse Company

The collecting of 20,000 pieces of first-class mail from hundreds of mail baskets distributed over several floors of a manufacturing plant nearly a mile in length is quite a task, and a still more difficult proposition is the collection of third-class mail, bulky, heavy and cumbersome. This is only a detail for a distributing department when compared with the interdepartment collection and delivery of every piece of mail from a note to a roll of blue prints.



Two Storage Battery Trucks for Making Mail Deliveries Were Supplemented by Modified Tricycles for the Lighter Mail. The tricycle girls are the latest addition to the delivery system

The Westinghouse Electric & Mfg. Co., at East Pittsburgh, has dealt with this problem in an interesting manner, from time to time, as its force has expanded from 200 to 15,000 employees, the works covering a floor space of 91 acres. It is hard to visualize the size of the job. If the first-class letters sent out daily were put end to end, so that the addresses could be read easily for sorting, they would reach over two miles, and this is only one branch of the mail. The quantity of mail handled has converted the little third-class office of East Pittsburgh into a first-class office doing a yearly business of over $250,000. This office handled recently 75,000 pieces of third-class mail from the publicity department alone.

For several years mail delivery boys were used, until the mail-boy organization became a problem in itself. One boy cannot carry any large quantity of mail on a trip, and collect outgoing mail at the same time, especially if his trip takes him to a point three-quarters of a mile from the central office.

During 1916 and 1917 considerable saving was affected by a change from the boy-delivery system to the use of a storage battery truck. The truck was equipped in a manner similar to a railway mail car, and furnished the same kind of service—one man on the truck sorting the mail received, while the truck was making the trip. Two of these trucks were used and were very successful in handling heavy and bulky mail, but had a questionable efficiency for the smaller sized mail. The principal objection to carrying all the mail by trucks was the difficulty experienced in getting through the shop aisles, and as the work became more congested, due to war work, crowded aisles delayed the mail service. However, a more effective method has been evolved since for the lighter mail.

The pneumatic tube system similar to that installed in any large business organization now handles the small first-class mail, but the collection and distribution of such mail as packages, magazines, circulars, blue prints, etc., pieces too large for the tubes, and hardly large enough for truck service, was still a problem.

Then a rather novel but inefficient scheme was used to deliver the local house organ. Boys were supplied with roller skates. Often the floors were greasy and there was danger of accident, and boys will be boys, especially on roller skates, so this test proved unsatisfactory for general use.

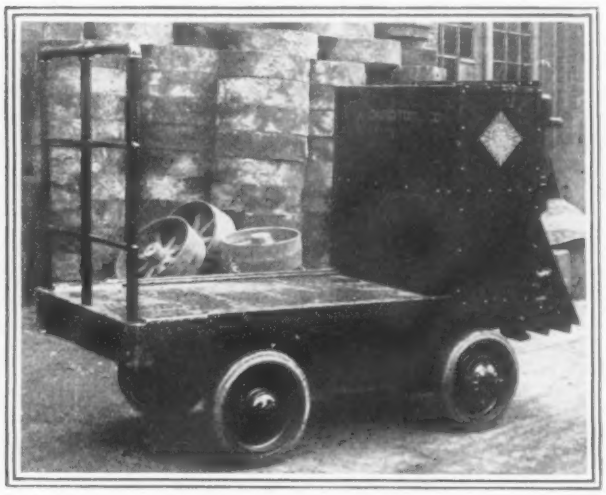
Early in 1918, thinking of a system used in delivering merchandise, a light tricycle was suggested which would support a mail box. Nothing that answered the requirement was on the market; so a machine was designed and built, similar to the one illustrated. This tricycle is narrower and lighter than the truck, and is easier to handle in a crowded aisle. At present there are four in use.

The tricycle weighs 150 lb. and is of regular bicycle construction, with the addition of a sheet metal box, which contains 22 small and three large compartments, each marked with a metal label. The lower portion is divided into two large compartments for packages and long rolls of blue prints. The shortest complete trip made by any tricycle is .09 mile, and the longest 2.1 miles. Two tricycles in the service make 10 trips a day, and two make eight trips. In the year all of these vehicles travel approximately 14,295 miles.

The opening of the year 1919 brought a pleasing feature into the mail service, and that was the use of uniformed girls on the tricycles. The tricycles are light and easy to pedal, and the work, because of this system, so easy that the girls are taking to it readily.

Small Electric Trucks for Factories

With the more extensive use of electric trucks and tractors in manufacturing plants, various machines of special types and sizes have been brought out to meet special requirements. A late addition to this line of factory transportation equipment is a new truck built by the Elwell-Parker Electric Co., Cleveland. This is said to be the smallest truck ever built, and is designed for use in plants with closely set machinery, narrow aisles and small elevators, features that are more



Electric Truck Designed for Plants with Narrow Aisles and Small Elevators

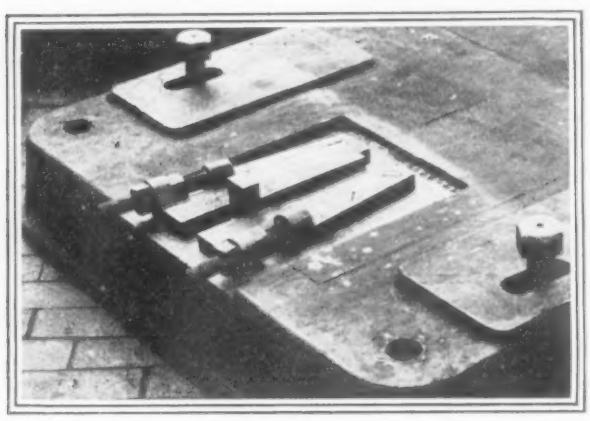
prevalent in old plants than in those of modern construction.

The truck is 30 in. wide, has a 48-in. platform, and is 78 in. long overall. The outer edge swings on an 8-ft. radius and the inner edge on a 3 ft. 9 in. radius. The carrying capacity is 3000 lb. In construction and drive it follows the company's standard design, having 2-wheel steer with vertical control, and 2-wheel drive with the motor direct-connected to a worm on a full floating axle.

It has an Elwell-Parker heavy-duty motor, drum-type controller, and is equipped with Edison or lead batteries located over the driving wheels. There are three speeds in either direction ranging from 400 to 650 ft. per min. The brake is foot-operated. The wheels are solid and demountable, with solid rubber tires, 15 x 3½ in.

Adjustable Anchorage for Motors

A device for supporting and aligning motors from 50 hp. up is being marketed by the Adjustable Anchorage Co., Detroit. By the use of this anchorage it is



The Adjustable Wedges of this Motor Anchorage Provide for Accurate Shaft Alignment

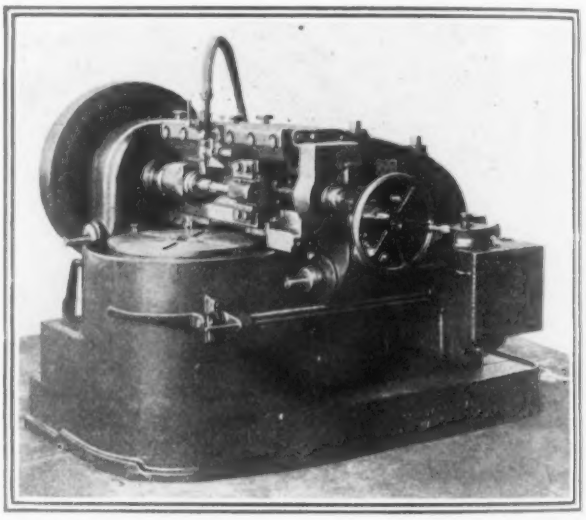
possible to move the motor to a limited extent in all directions, so that the motor shaft may be accurately aligned with the machine to be driven. The device can be used on motors driving belts but is particularly for those equipped with magnetic clutches which require a very fine and accurate alignment. When the clutch surfaces wear, the motor can be moved forward readily by loosening the motor to bed plate bolts and moving the wedges.

It is also pointed out that motor installations can be made without resorting to extreme closeness and skill, as the final permanent alignment can be obtained through the adjustable wedges; also in case the journal wears unevenly, the motor can be rotated and brought up into position again.

An 18-In. Worm Wheel Generator

The rapid increase in the manufacture of worms and worm wheels for use in motor trucks, tractors, elevators and worm gear reduction sets, has created a demand for machines designed especially for this class of work. To meet this demand, Gould & Eberhardt, Newark, N. J., are offering a machine that will automatically generate worm wheels with a tapered hob having a tangential feed, a straight hob wherein the hob is fed into the worm wheel and not across it, and provides for cutting worm wheels by means of a flytool. The latter method is particularly useful when carrying on a series of experiments where it would be costly to make up special hobs for every wheel.

The cutter spindle drive is through a worm and worm wheel, with a large flywheel, mounted directly on the end of the cutter spindle. To insure rigidity, the table is mounted in a permanent bearing in the base, while the cutter or hob carriage is mounted on a horizontal adjustable stanchion. This permits the work



This Machine Will Generate Worm Wheels to a Maximum of 18 In. in Diameter; Will Swing a Hob of 5½-In. Maximum Diameter and 8-In. Maximum Length

table being arranged with a long cylindrical hub bearing in addition to a conical and flat bearing and an indexing worm wheel of large diameter, which could not be incorporated if the work table was mounted in an adjustable carriage.

The work table or face plate is of convenient height for loading and unloading. Running parts are accessible and necessary operating levers are conveniently located at the front of the machine.

The drive is with a single pulley, and a high speed clutch is incorporated so that the machine may be quickly started or stopped. There are six changes of cutter speeds, ranging from 58 to 183 r.p.m. A differential mechanism enables the operator to take a second cut through a worm wheel when using a tapered hob or flytool without losing the load. It also permits changing the feed without changing the lead gears. When using a straight hob, with automatic infeed, the differential is not required and locking is provided.

Egleston Brothers & Co., Inc., 166 South Street, New York, iron and steel jobber, has purchased property 200 x 300 ft. on School Street, Long Island City, N. Y., which it will hold for future needs. Press reports of plans for a warehouse are without foundation.

View of Unemployment from Employers' Side

Accuracy of Some Reports Doubted and Exaggeration Discounted — Employers Striving to Hold Skilled Men and Letting Slackers Go — Work for Soldiers Is the Rule

REPRESENTATIVES of the national associations connected with the metal trades and founders are of the opinion that the unemployment situation is not as bad as has been pictured by recent reports. They are openly skeptical of figures supplied by the United States Employment Service, and they do not hide their satisfaction over the failure of this service to obtain an appropriation of over $14,000,000 for the continuance of its work. The present appropriation expires June 30, and the fear now is that an effort will be made to include the appropriation in next sundry civil bill.

The employment service has been opposed, not only as unnecessary, but as partisan in that it is alleged to be operating in the interest of organized labor. The New England Manufacturers' Association has voted that it be dissolved as "inimical to the public good." It is charged that the unemployment figures disseminated by the service emanate from labor union sources.

With regard to the actual number of unemployed, the difficulty presented consists not only in the constantly varying conditions, but in the absence of any medium through which quick, accurate and unbiased reports can be obtained. No medium for the gathering of such figures is absolutley inclusive. The present situation is not considered extremely bad by those studying it, but a bad construction is apt to be placed on existing conditions by sensational newspaper reports and the constant hammering away at the fact that there is unemployment, those so impressed overlooking the fact that unemployment always exists.

Skilled Men Can Be Placed

Officials of the National Metal Trades Association say that in spite of all the emphasis being placed on unemployment there is not much difficulty in placing skilled men at work; and that one phase of the situation is that many men who were employed as specialists on munitions work could get employment were they not striving to get jobs that will pay them as well as did the war work.

In a report under date of March 10 Charles H. Lay, secretary of the Hartford, Conn., branch of the National Metal Trades Association, stated there had been no perceptible increase in the number of unemployed in that city since March 1, on which date a house to house canvass was made by the local authorities. The canvass showed that 2500 were idle, including 500 or 600 who seldom work, others who occasionally put in a few weeks, and 300 or 400 shop girls then on strike. The number of applicants at the employment bureau of the branch showed a decrease, and but few skilled men, such as gage, die, toolmakers and draftsmen, were among those who applied.

Hartford members of the association in February reinstated 442 United States service men to their old positions, and the bureau furnished 39 men with jobs. Mr. Lay states that of the number of men reinstated, 20 did not report for work; two would not accept the work, though offered 32 and 42c. per hour respectively, and five of those sent by the bureau did not go to the positions at all. In the meantime, a local ice company wanted 300 men to harvest its crop and was willing to pay 40c. per hour. He states that the shop men out of employment are mostly unskilled hands, and the large number recruited in the past emergency from all kinds of employment.

Conditions in Various Cities

Other reports received at the main office of the National Metal Trades Association in Chicago, and which appear in the March 13 issue of the association's bulletin, follow:

Chicago.—The Employment Bureau record shows more men applying for positions than at any time in the past months. Quite a few men released from the United States service have been placed by the bureau.

Columbus, Ohio.—There lately has been a slight change for the better in the die and tool business. Otherwise labor conditions in this district are approximately the same as those reported last week. (In the preceding week no change was reported.)

Detroit.—The number of men employed and discharged in the past week just about balances. Reporting for 117 firms employing normally 160,000 men, their forces are now 138,600. Discharges in the week were 568, and those employed totaled 596, showing a net increase in employed of 28. Some plants are running part time, due to shortage of material or shortage of orders. There is still a slight uncertainty in some lines where plants are working on stock, but the general tone is one of optimism. There is no large surplus of labor in any line in Detroit, probably because many munitions workers left the city on the termination of their jobs. In some limited lines, we have considerable difficulty in meeting the demand.

Decided Improvement

Indianapolis.—The general labor situation in Indianapolis showed even more decided improvement since our report of last week, and equally encouraging information has been received from a long list of Indiana towns. In the Calumet District of Northern Indiana an acute labor shortage is feared. This district is known as the "melting pot" because of the extensive mixed foreign population, and its industries will be seriously affected by immigration restrictions. Four large plants in the Calumet district, employing a total of 14,577 men, have in their employ 5073 native Americans, 3327 naturalized foreigners, and 6177 unnaturalized foreigners. Asked whether they desired to return to Europe, it is said 2245 of these foreigners replied in the affirmative. Of the foreigners examined, says the Federal Labor Director of Indiana, 1371 were Roumanians, 662 Polish, 535 Greek, 377 Croatians, 352 Serbians, and other representatives of 27 nationalities.

Moline.—At this time we have a small surplus of machine operators, most of them semi-skilled, but we are short of toolmakers, machinists and set-up men, also metal patternmakers. The women in various plants in many instances are leaving voluntarily, thereby giving places to the men. All demobilized soldiers have been reinstated to their old jobs or their equivalents, and in addition to this we have placed a large number of men who were not employed in the Tri-Cities before entering the service. Generally speaking, the situation here is good.

Muskegon.—Taking the city as a whole, there is not as much business as there was during the period of the war. A few lines, however, are more busy than ever in their history. It is a fact that wages, bonuses, premiums and piece-work rates are not being cut in any factory in this city from the war-time schedule. It is a fact, also, that a few of our shops have curtailed their running time, owing to lack of business, and this naturally has reduced the earnings of a portion of the workmen; and for the same reason a number of the industries have reduced their number of operatives, the weeding out process tending toward increased production and better organization. We have, therefore, a small percentage of unemployed, these being almost wholly those of little experience in industry and without trades of any kind.

In the past week we co-operated with a manufacturers' association in a neighboring city in hiring some of these unemployed for plants located in that city.

St. Louis.—In general, conditions continue without much change in this district (a similar report was ren-

dered a week previous), although few plants are running normal. Most of the returning soldiers are being restored to their former positions. Among the unemployed are found very few good mechanics in our line.

Syracuse, N. Y.—The labor situation is about the same. Little hiring is being done at the plants, and few men are leaving. There is no labor trouble among our members at present and none is brewing.

Working Hours Are Being Curtailed

An officer of the National Founders' Association also emphasizes that conditions are not as bad as they are painted. He points out that while many firms are operating only four or five days a week, the men still have jobs and their employers are trying to hold those who are worth holding. It is admitted they are ridding themselves of slackers and endeavoring to put their factories on an efficient basis. Around Chicago, he pointed out, there always are several thousand "floaters."

Aside from the fact that employers are trying to hold their skilled men and, in some instances, looking for more of this kind of labor, a dominant feature is the general tendency to care for the returned soldier. In Muskegon, for instance, the employers declare they are not going to have it said that returned soldiers were not cared for in that city. The members of the Employers' Association have agreed to that, and if a plant happens to be down a soldier is asked to return in 48 hr., his name having been taken. The name is reported to other members of the association and a place is found for the man in some plant other than the one he left to go to war. Indianapolis is doing much the same, and other cities likewise.

Returning Soldiers

The unemployment situation in the metal trades is declared to be rendered less serious because of the fact that these trades are well organized and maintain employment bureaus. In some places conditions would be better were it not for the number of returned soldiers not residents who want to settle in them.

In reply to a questionnaire recently sent out by the Chicago Association of Commerce to manufacturers in Chicago and vicinity, 346 answered. The firms addressed employ 46,940 skilled and 56,243 unskilled men, as compared with 52,207 skilled men and 44,143 unskilled on Nov. 1, 1918.

Full two-thirds of the firms stated they would take on no new men during the next three months.

In reply to a question regarding the laying off of the employees during the next three months, 253 concerns replied they do not intend to release any skilled men and 251 do not expect to let out any unskilled labor. The release of skilled men by 21 firms is likely and 23 expect to lay off unskilled men. More than 300 firms replied there is no labor shortage.

Enumerates Causes of Unemployment

Industry, published at Washington, to enable itself to better judge the problems which were to face the meeting of governors and mayors in Washington early this month (incidentally taking exception to the fact that no employers were invited to attend by the Secretary of Labor), sent out a questionnaire to corporations and firms in 26 states. The questionnaire inquired into the extent and causes of unemployment, etc. The answers received cover 31 principal industries in those states, the number of employees represented by the manufacturers answering being practically one million. *Industry*, in its March 1 issue, says:

Variety of Conditions

"The first two questions dealt with the fact of unemployment and the replies indicated a variety of conditions. In some few cases there is no unemployment; in others, there is a very limited number of workers out of jobs. In others there is unemployment which is at least so recorded, but which is due principally to strikes, while in some sections there are large numbers of unemployed. It would be impossible to detail the replies, but the substance is that there is unemployment, that there are certain causes which produce this unemployment, that strikes figure very largely in the totals which are submitted, for example, by the United States Employment Service and that, in fact, a substantial part of the unemployment is what might be called voluntary. There is a tendency noted, however, in certain sections to an increase in unemployment and the point is made that this will be augmented unless certain causes which are specifically responsible are removed.

"The third question dealt with the reasons for unemployment, and it may be interesting to summarize the points which have been made as to the basic causes. Some of them are as follows:

"1. The abrupt stopping of war work.

"2. The failure of the Government to pay manufacturers their just claims in connection with war contracts.

"3. The absolute lack of a fixed policy on the part of the Government resulting in

(a) Hesitation and uncertainty.
(b) Instability of raw materials.
(c) High cost of labor.

"4. Decreased efficiency on the part of workers, making for decreased production and prohibitive costs.

"5. Strikes for decreased hours and increased pay.

"6. The consuming public buying only according to its actual immediate needs.

"7. Lack of buying by the Railroad Administration.

"8. Talk of price fixing and Government interference.

"9. Instability of labor caused by Governmental coddling.

"10. Return of migrants who went to war work and returned with new ideas of their own importance.

"11. Uncertainty as to credits.

"12. Governmental paternalism.

"13. Excessive taxes.

"14. Refusal of men returning to their home towns to accept the work which they had before the war."

Decisions by the National War Labor Board

WASHINGTON, March 18.—The war is still on as far as the National War Labor Board is concerned. In a decision which the board has just handed down increasing the pay of the employees of the Industrial Manufacturing Co., Camden, N. J., the board provides that "this finding should remain in force for the period of the war." To make sure that this might not be interpreted as having expired last November, the board further provides "that the parties may, at intervals of six months, beginning May 1, 1919, make application to this board, or such other agencies as may be mutually agreed upon, for such adjustments as changed conditions may render necessary."

The award made gives the employees the rates "now in effect at the Frankfort Arsenal" for the same service.

The War Labor Board has also established a precedent in the question of the rate of pay for Sunday night work that might be considered part of the Monday morning shift. In the case of the employees of the Athenia Steel & Wire Co., Athenia, N. J., the board ruled:

"The evidence presented is not clear, in that it does not show whether or not the time worked on Sundays between the hours of 6 p. m. and midnight Sunday night is performed by men working on their seventh day or within the hours of their regular working schedule in their 6-day week. We recommend, therefore, that when the work performed between the hours of 6 p. m. and midnight of Sunday is done by men working outside of their 6-day week schedule, and who are doing this work on their seventh day, that compensation for such work shall be paid for at the rate of double time; where this work on Sundays between 6 p. m. and midnight is per-

formed by men working within their 6-day week schedule, the existing rates should continue."

Union Demands Denied

Judge Julian W. Mack, appointed as umpire by the board in the controversy of the International Molders' Union, Local No. 11, against the Rochester Founders, Inc., has ruled against the demand for an 8-hr. day as well as most of the wage demands. The workers asked a $6 minimum and an 8-hr. day on Aug. 30. A strike followed, which ended when the case was submitted to the War Labor Board. The offer of the manufacturers was a minimum of $5.25 a day with 75c. increase over prior wages to those who had previously received more than the minimum. In November the manufacturers increased the pay to $5.64 a day. In announcing the award Judge Mack said:

"While the views originally expressed by the umpire in other cases in regard to the 8-hr. day are entirely unchanged, they are inapplicable to the present situation, for it is clear here that the parties renewed their agreement for a year based upon the so-called 9-hr. day as theretofore observed, and subject only to one term as to which there was a misunderstanding, namely, the length of time for which the $5.25 minimum with 75c. increase to the high men should be applicable. Viewing the situation in the aspect most favorable to the workers, they had the right at any time to demand an increase in wages. They had no right during the year to demand a change in hours.

"I cannot find on the evidence that an increase in wages beyond $5.64 per day is to be sustained, but in view of the negotiations and relations of these parties, I award these wages as a minimum for the period ending April 30, 1919. The award in this respect shall be retroactive to Sept. 1, 1918. No other change in the relations of the parties shall be effective until May 1, 1919, and then only if at least 30 days' notice of changes desired shall have been given prior to that date."

Reading Plants Involved

The War Labor Board also handed down a decision recommending an adjustment of wage rates by agreement in the case of the machinists, tool makers' helpers, and apprentices against the Birdsboro Steel Foundry & Machine Co., Safety Machine Corporation, Berks Engineering Co., Orr & Sembower, Reading Chain & Block Corporation, American Tool & Die Co., Bethlehem Steel Corporation, Dundore Mfg. Co., Reading Standard Co., and Reading Iron Co., all of Reading, Pa. This case was presented only by the men. In its recommendations the board reported:

"We find that 50c. per hr. for mechanics is a low wage and should be materially increased. We recommend that the companies involved in this case should adjust the wage rates so that they will conform to the prevailing rates of their respective localities for similar services. We find at the hearing the employers agreed to the question of collective bargaining. We recommend that the employees of each company meet at the earliest time possible and adopt a system for the election of shop committees, for the purpose of adjusting the wages and other working conditions."

The Carpenter Steel Co. and the Long Henkle Patents Co., originally involved in the case, made a settlement with their employees before hearings were held. The complaint of the men in the other corporations showed that, except in the case of the Bethlehem Steel Co., the employees were working five days at 10 hr. a day and 5 hr. on Saturday, but that the Bethlehem company granted a basic 8-hr. day Oct. 1, 1918.

Based on the expressed willingness of the Russell Motor Car Co. of Buffalo to install the so-called "Buffalo award," made by the War Department, the War Labor Board recommends its establishment in the shops of this company. It also recommends that the question of the discontinuance of piece work be left to the decision of the employees as suggested by the company.

The board recommends a shorter workday in the plant of the Williamsport Wire Rope Co., Williamsport, Pa.

"The evidence discloses," says the recommendation of the board in this case, "that the work performed is monotonous in character and the hours of work are excessive. We hold these long working hours do not promote the health, comfort, and well being of the workers, and it is our opinion that these excessive hours retard rather than enhance the efficiency of the employees."

In cases involving the Otis Steel Co., Cleveland, the Linderman Steel & Machinery Co., Muskegon, Mich., the Detroit Forging Co., Detroit, the Standard Plunger Elevator Co., Worcester, Mass., the LaCrosse Plow Co., LaCrosse, Wis., the John Bath Co., Worcester, Mass., Spang & Co., Butler, Pa., and Winslow Brothers Co., Chicago, the board declares that the right of the employees to organize should be recognized by the companies, but warns the employees that in the exercise of this right they "should not use coercive measures of any kind to compel persons to join their unions or to induce employers to bargain or deal with their unions."

In the complaint made by six labor unions in Chambersburg, Pa., against the Wolfe Co., Chambersburg Engineering Co., Chambersburg Foundry & Machine Co., and Hafer Foundry & Machine Co., of that city, the board decided that the wages prescribed by it last summer in Waynesboro should be extended to Chambersburg. The two cities are 16 miles apart and represent the same living conditions, says the board.

"As a practical matter," says the decision, "wages and other labor conditions ought not to be and probably could not be long maintained on a materially different basis as between the two cities."

By agreement the awards are made retroactive to Aug. 26, 1918. To this the Wolfe company had demurred.

Accused of Bad Faith

Although admitting its impotence to make a valid order in the case of the employees of the Maryland Pressed Steel Co. of Hagerstown, Md., the War Labor Board issued a statement accusing the company of having treated its men in bad faith by promising to submit the controversy to the board and then failing to keep that promise. The employees of this company asked higher wages last summer, and the case was sent to the War Labor Board Sept. 5, 1918. There was to be joint submission, as the company promised to take up the question with a committee of the employees. A shop committee was selected, but in December, says the statement of the War Labor Board, the company declined to proceed further with this collective bargaining with the shop committee.

"This company was doing work for the Government," says the board, "and at a most critical time during the war it assured its employees and this board that it desired to carry out the principles of this board and would deal with committees of the employees. This promise it later refused to carry out. It is greatly to be regretted that at a time when it is highly important that the relations of employer and employee should be maintained on a friendly basis, this company should have committed so flagrant a breach of good faith with its men, and although the case is not one of joint submission which permits the board to make a binding award, it cannot pass over the case without expressing severe condemnation of such conduct on the part of the company."

The board also added the following to its list of cases in which it recommended the election of shop committees for the adjustment of grievances:

Becker Milling Machine Co., Hyde Park, Mass.; Middletown Car Co., Middletown, Pa.; Sterling Machine & Stamping Co., Wellington, Ohio; Ingersoll Milling Machine Co., Free Sewing Machine Co., Rockford Lathe & Drill Co., Rockford Milling Machine Co., National Lock Co., Rockford Machine Tool Co., Star Bit & Tool Co., Thayer Action Co., Rockford Tool Co., Woodward Governor Co., B. E. S. Tool Co., Sundstrand Adding Machine Co., Rockford Drilling Machine Co. and Mechanics' Machine Co., all of Rockford, Ill.

Arthur G. McKee & Co., engineers, Cleveland, have taken a contract for a furnace top for the second stack that is now being erected at the Midland, Pa., works of the Pittsburgh Crucible Steel Co., Pittsburgh. This company's first stack is equipped with a McKee top.

BLAST FURNACE SLAG CONCRETE

British and American Results of Its Use in Place of Gravel, Rock, Etc.

An exhaustive paper by Dr. J. E. Stead was read late last year before the Cleveland Institution of Engineers (British) entitled "Blast Furnace Slag in Concrete and Reinforced Concrete." In introducing the paper Dr. Stead says that it has been stated that after the war about half a million houses must be built in Great Britain to accommodate the increase in population; that it is anticipated that there will be difficulty in rapidly obtaining ordinary building material and that as a result reinforced concrete will largely take the place of bricks and mortar. The paper fully discusses in all its phases the extent to which blast-furnace slag is useful in making reinforced concrete. The author's general conclusions are as follows, together with extracts from some discussion:

The experience obtained in the Middlesbrough district over 50 yr. has established the fact that clean blast-furnace slag as an aggregate in concrete is quite as good as or better than gravel or white stone.

The much shorter experience and the results of most searching practical trials in America comparing by experiment concretes containing slag as aggregate against concretes containing pebbles, trap rock and limestone, have shown that slag concrete is stronger after like periods of seven days to two years.

Slag concrete in reinforced constructions has been used in this district for many years; in no case has failure followed its use, and, according to the authority of James Crombie, when it has been necessary to demolish such structures the iron has been found to be intact and free from rust.

Our American friends have also found that slag concrete is not injurious to iron and steel.

For sea-resisting slag, concrete has been found to be excellent as is proved by the sea pier at the mouth of the River Tees at South Gare, and the slag cement aggregate concrete pier at Skinningrove.

Many trials by the author and by the National Physical Laboratory have proved that blast-furnace slag by itself is not corrosive on ferrous metals, and is a very valuable protective covering to iron and steel when in the form of slag wool.

Experiments conducted in the author's laboratory have shown that all blast-furnace slags yield alkaline solutions to distilled water, owing to some of the lime being soluble, and this property suggests that slag should be more valuable for reinforced concrete than material which is not naturally alkaline, such as shingle, pebbles, etc.

The only objection to slag concrete is that when it is damp it exhales slight traces of sulphuretted hydrogen, which is sometimes detected in the living rooms of dwelling houses, the floors of which have been laid with slag concrete. When in the form of stairs and landings, etc., if there is any evolution of sulphuretted hydrogen, so far as can be ascertained nobody has noticed it. The lower floors of the author's laboratory are made of slag concrete, and nobody has detected any objectionable smells during the last 22 yr.

The evidence from all sources is that a high percentage of magnesia in blast-furnace slag or slag cement is not a disadvantage. One American civil engineer maintains that the necessity for weathering the slag is not so great for slags containing 5 to 6 per cent magnesia as it is for slags containing 2 per cent.

Owing to the high percentage of both magnesia and alumina and low percentage of lime in slags from furnaces working Cleveland ironstone, such slags when pure have never been known to disintegrate on weathering, and, in the author's opinion, Cleveland slag need not be weathered at all. This opinion has been fully confirmed by the long experience of James Crombie, who has found that freshly made pan Cleveland slag makes the best and most reliable slag concrete—better than the slag from old heaps, which is liable to mix with other matters of an injurious nature.

Hematite slags from furnaces using dolomite as flux, being high in magnesia, rarely, if ever, fall to pieces on weathering, and should be valuable as an aggregate in slag concrete.

We have little evidence of the relative value of ordinary hematite slags low in magnesia, but the hematite slags produced in furnaces smelting Lake ores—which are relatively low in magnesia—have been found to be excellent for concrete aggregates after weathering for at least six months.

The powder of calcareous hematite slags—the result of disintegration—has been used in the Cleveland district after mixing with sand into mortar, which has set to extreme hardness.

Hematite slags, the richer they are in lime the better they are for cement making in the rotary kiln.

Messrs. Deny and Lewis have not only shown that excellent Portland cement can be made from slags corresponding in analysis to hematite slags made in the Cleveland district, but that the ground slag without any admixture has good cementitious properties.

The last-named authorities have proved that the tensile strength of mixtures containing 70 per cent Portland cement, iron Portland cement, and 30 per cent slag sand is greater than that of neat cement alone.

The final conclusion arrived at is that such engineers who bar slag as an aggregate in reinforced concrete have been unnecessarily cautious, for the evidence from all sources is that slag is superior to limestone, trap rock and pebbles for any kind of concrete, and that the sulphur in the slag does not attack or corrode the iron or steel bars bedded in the concrete, but is itself protective against corrosion.

It is advisable to use only such slag as is fine and free from foreign deleterious substances, and to avoid taking slag from mixed or doubtful dumps, otherwise the concrete may in time expand when placed in damp situations.

James Crombie, in the discussion, suggested that the manufacture of slag bricks should be taken up by ironmasters. For a firm with a good output of Cleveland slag and plenty of room for development there was a good opening, and he could say after 40 yr. experience that he had never found any deterioration of iron in ferroconcrete.

R. H. Auber Coulson, Newport Ironworks, submitted a number of samples, remarking that people were at last beginning to realize the possibilities of slag. He went on to give the results of a series of tests as to the fire-resisting qualities of various materials, carried out by the British fire prevention committee. These showed that burnt ballast and breeze came first, furnace slag second, and the rest nowhere. As an example of the strength of slag mortar, he had occasion to pull down the gantry walls at the Newport plant. The walls were of good red pressed bricks with slag mortar, and he found that in most cases the brick broke before the mortar.

H. G. Scott said he had used a slag concrete 20 yr. ago. He had since had to take it out. He found it the hardest concrete he had ever had to deal with, and as for the iron, it had, he thought, really improved.

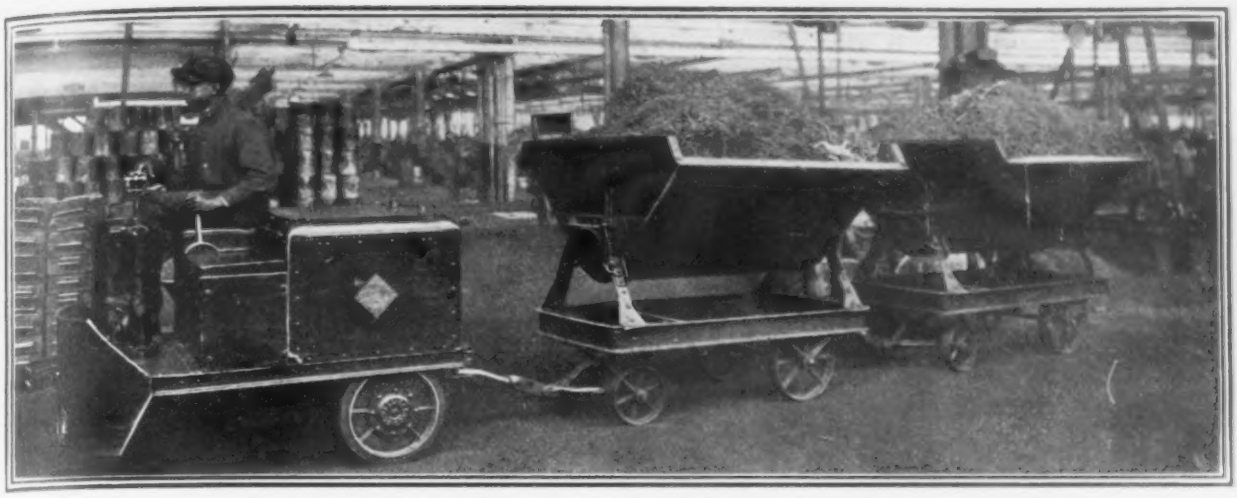
Supply Convention Committee

For the joint convention of the National Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association to be held in the William Penn Hotel, Pittsburgh, May 14, 15 and 16, a Pittsburgh convention committee has been organized to take care of the meeting and provide entertainment for the delegates. The committee chairmen of the Pittsburgh convention committee are as follows: Automobile—J. E. McLain, Midvale Steel & Ordnance Co.; demobilization—R. A. Lackner, Neely Nut & Bolt Co.; dinner—W. W. Sanderson, The Carborundum Co.; finance—H. B. Wheeler, American Sheet & Tin Plate Co.; hotel—A. M. Harper, Carnegie Steel Co.; hospitality—C. W. Wright, Steel Car Forge Co.; ladies—Robert F. Blair, Pittsburgh Gage & Supply Co.; publicity—E. S. Rooney, Youngstown Sheet & Tube Co.; reception—Jno. F. Hazen, Pittsburgh Steel Co.; registration—W. C. Carroll, American Sheet & Tin Plate Co.; speaker—Robert Garland, Garland Mfg. Co.

Machine Tool Builders to Meet in May

The spring convention of the National Machine Tool Builders' Association will be held at the Hotel Traymore, Atlantic City, on Monday and Tuesday, May 12 and 13.

A conference on democracy in industry will be held under the auspices of the New Jersey State Chamber of Commerce at the Robert Treat Hotel, Newark, on the afternoon and evening of March 28. H. R. Heydon, Clinton Building, Newark, is secretary.



A Storage Battery Tractor Hauls Two Trucks Loaded with Turnings, from the Plant to the Storage Pit. The truck hoppers each have a capacity of approximately one ton

HANDLING SCRAP

Systematized Scheme for Gathering, Cleaning and Transporting Turnings

One of the subjects that was given a great deal of attention by the National Acme Co., Cleveland, when it erected its new screw machine products plant was the handling of scrap, and the method adopted of taking care of this material is of interest because it has proved both convenient and economical, and is a decided improvement over the method formerly used of handling scrap in wheel-barrows.

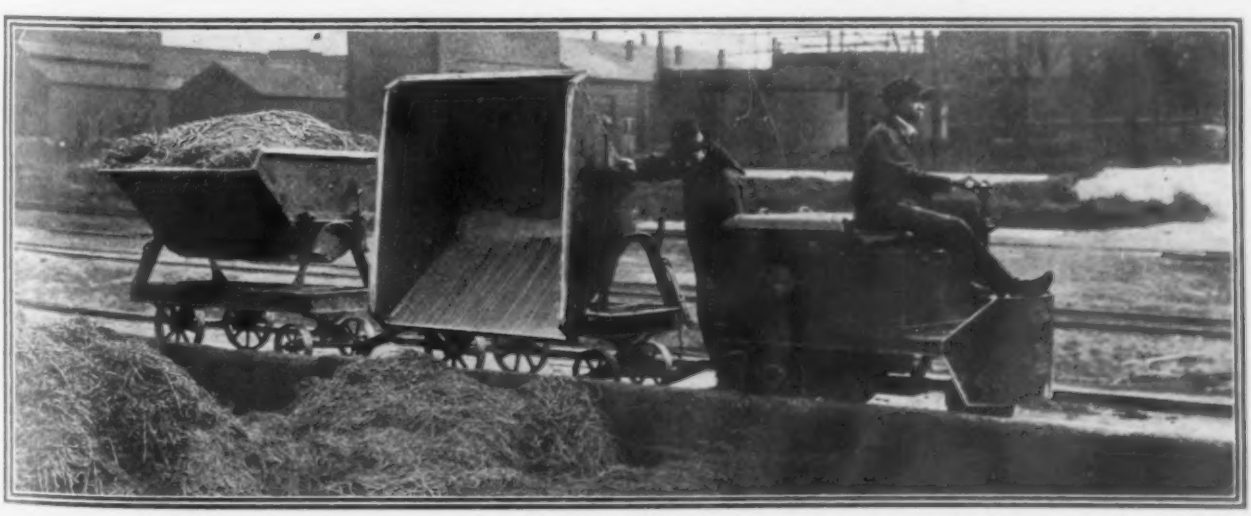
The company at present produces in its plant about 40 tons of scrap per day, but this output will be considerably increased with the plant running at full capacity. The scrap is all turnings, which are bulky in form. The day's output in screw-machine products and scrap is scraped out from beneath the machines at night in order that a full day's work can be done on the automatics during the daytime. The material is placed in steel buckets about 8 in. in diameter and 14 in. deep. In the morning the buckets are dumped into oil separators, and after the oil is extracted the product and scrap go to the chip separators. From these the product passes on through washing machines to the inspection department. Every machine is numbered and a large sheet iron tag bearing the number travels with the work until the product is weighed and recorded. Then the tag is sent back to the machine from which it came.

The turnings are shoveled from beneath the chip separators into dump hopper trucks. Six of these trucks are used and one storage battery tractor is provided for hauling the trucks. Usually the tractor hauls two loaded trucks. The capacity of the truck hopper is 40 cu. ft., or approximately 1 ton of turnings.

The scrap is hauled outside the building and dumped into a concrete pit 200 ft. long, 25 ft. wide and approximately 12 ft. deep, and having a capacity of about 30 carloads of turnings. This pit is built in the platform alongside of two railroad tracks at the side of the plant, these tracks also serving the raw material receiving department. Sufficient space is provided for running the trucks on either side of the pit. From the pit the scrap is loaded on cars with a locomotive crane equipped with a grab bucket. It takes only about 30 minutes to load a standard railroad car. The crane is electrically operated, the electrical connection being made through plugs located near the track in the platform. A railroad scale is located in one of the sidings for weighing the empty cars and loads of material.

The trucks are of the mill type construction, fitted with steel side dump bodies. They were built by the Pressed Steel Truck Co., Pittsburgh. The tractor used has a 300-lb. drawbar pull, or 6-ton capacity, being a standard type of tractor built by the Elwell-Parker Electric Co., Cleveland. The locomotive crane was supplied by the Orton & Steinbrenner Co., Huntington, Ind.

The first steel oil barrel company in Canada is being created from the Canadian Cartridge Co., Hamilton, Ont., organized by Sir Frank Baillie after the outbreak of the war. In war time, nearly 1100 men and women were employed and the full capacity will probably be used in the new line of work. Most of the profits from munitions were patriotically turned back to the Government.



The Truck Drops Its Load into a Concrete Pit of 30 Carloads Capacity. A locomotive crane with a grab bucket loads the turnings into railroad cars

Air Compressor for Tires

A portable electric air compressor for inflating tires is announced by the Black & Decker Mfg. Co., Baltimore, Md. The pressed steel reservoir, 14 x 30 in., holds

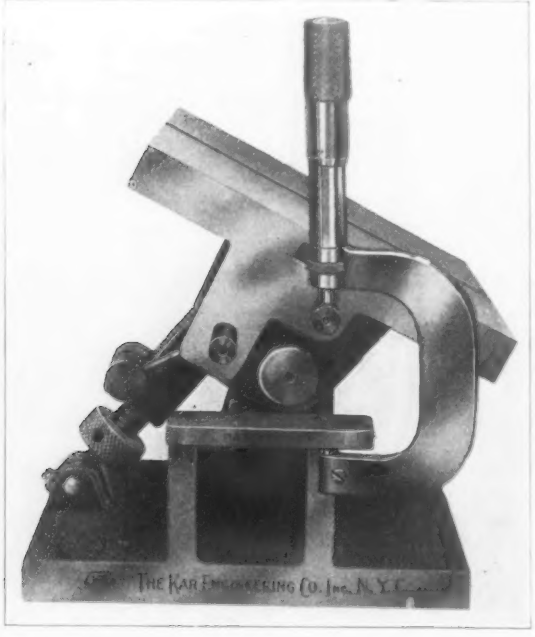
Compressed Air Outfit for Inflating Automobile Tires

sufficient air, it is asserted, to inflate five average tires from flat to full pressure, or 10 tires from 40 to 80 lb.

The compressor is operated by a ½-hp. motor running on alternating or direct current. The motor, gear train and compressor are enclosed in one housing, the motor and compressor being cooled by forced circulation of air through this common housing. Motor, gears and compressor, including cylinder walls and piston, are grease lubricated.

A Sine-Angle Measuring Plate

The Kar Engineering Co., 79 East 130th Street, New York, has recently placed on the market a sine-angle plate for measuring any part of a quadrant

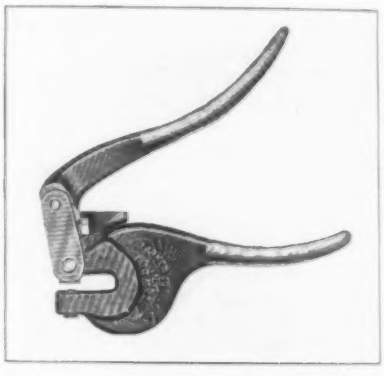


No Special Measuring Tools Are Required for Setting Angles on This Plate for Measuring by the Sine or Cosine Function

without special measuring tools. It is made up of a movable plate swiveled on a stationary base, the movement being permitted through a full quadrant. The motion of the plate is controlled by the telescopic adjusting screw which acts as a brace for the plate. It is said that all loose play is taken up and a rigid support for the plate secured by operating a small lever. The pivot on which the plate moves is provided with a nut and clamping sleeve, made to slide lengthwise but prevented from turning by a key let in between itself and the plate lug. This arrangement is designed to hold both lugs of the plate without being subject to distortion. Measurements are taken over either of the two pins and the under-side of the over-hanging plate. The pins are provided so that the sines of both the angle and its complement can be used. For example: To set the plate at 25 deg., looking up, the cosine is found to be 0.9063 in.; setting the micrometer at this figure and placing the anvil beneath the under surface of plate, the plate is rocked by means of adjusting screw until the distance from beneath the anvil to above the pin gives this measurement. The plate is so set at the proper angle.

Hand Punch for Metal

A hand punch for cutting holes in sheet metal, embodying a number of new features, has been placed on the market by the Parker Supply Co., 785 East 135th Street, New York. It is designed with a link motion which so operates that the direction of the force approaches more and more a straight line as the punch bites into the metal, thus approaching maximum results from the effort applied. This feature, combined with a leverage of 48 to 1 and over at the position where the punch is cutting into the metal, makes it possible, it is stated, for a mechanic to punch up to



This Hand Punch Operates with a Link Motion which Gives Close to Maximum Results from the Force Applied and Makes It Convenient to Change the Punch

17/64-in. holes in 16 gage iron and over with one hand.

Another feature emphasized is the ease with which the punches and dies may be removed and replaced. By moving the swing stop to one side, the handle can be lifted out of position and the punch changed.

The punches and dies are made in sizes of 1/8, 5/32 3/16, 7/32, 1/4 and 17/64 in.

German Machine Tools

The chairman of the Schiess Engineering Co., Düsseldorf, Germany, addressing the shareholders at a recent annual meeting, referred to the question of machine tools, which, he said, were constructed in large numbers of the lighter types for munition purposes during the war, and as a consequence the world's markets were over supplied with these classes. On the other hand, medium sizes and heavy types, which the company specially built, had been produced only in small quantities and the hope therefore existed that the demand for these, particularly by the shipyards, locomotive works, etc., would now be considerable. The export inquiries for these types for working shipbuilding materials were already numerous, but hesitation was shown in the placing of orders because foreign buyers were uncertain whether the Germans could effect delivery under present circumstances.

The speaker remarked, however, that neutral countries had every interest in placing their orders now, because of the low price of the mark, for as soon as an improvement took place in the German rate of exchange, the export of medium and heavy machine tools would be out of the question unless the 8-hr. day was a matter of international regulation.

Correct Lubrication of Air Compressors

Cylinder Temperatures and Physical Tests of Oils Given as Guide for Selecting Lubricant — Cleaning Out the Carbon

BY H. V. CONRAD*

SATISFACTORY lubrication of air compressor cylinders is attained by securing the reduction of friction to a minimum and elimination of carbonization of the oil as far as possible.

For the proper reduction of friction, the oil chosen should have sufficient body to sustain the weight of the moving parts and to form a seal between the piston rings and the cylinder walls, and still not absorb excessive power in the overcoming of the viscosity of the oil itself.

The objections to air cylinder oils which allow more than the very slight amount of carbonization which appears unavoidable are, of course, well known, but may be briefly stated for the purpose of clarifying what follows:

Carbonization of the oil allows the accumulation of deposits of carbon which are sticky in the early stages of their formation but hard and flinty later. Such deposits accumulate on the cylinder valves, in the cylinder passages, in the pipes and eventually in the air receiver.

Table 1—Cylinder Temperatures at End of Piston Stroke

Air Compression in ℔ Gage	Final Temperature Single Stage in deg. Fahr.	Final Temperature Two Stage in deg. Fahr.	Remarks
10	145	...	Variations from these temperatures will occur in actual practice due to water jacketed air cylinders and radiation, tending to lower the temperature at the higher pressures. But at, say, 50 lb. pressure and lower, the heat is likely to be somewhat greater than given, particularly if the compressor is run at high speed and also if it is not water jacketed.
20	207	...	
30	255	...	
40	302	...	
50	339	188	
60	375	203	
70	405	214	
80	432	224	
90	459	234	
100	485	243	
110	507	250	
120	529	257	
130	550	265	
140	570	272	
150	589	279	
200	672	309	
250	749	331	

Sticking or partial closing of the valves and their consequent failure to act properly is probably the chief objection to this action from the standpoint of the efficient operation of the compressor.

The formation of excessive carbon deposits is apt to be due to any one or more of the following causes:

1. The ill-advised use of some oil, such as a steam cylinder oil, which easily decomposes in the heat of the air cylinder.
2. The use of oils of too great a viscosity—commonly referred to as "too heavy oils." These do not atomize readily and, therefore, remain too long upon the hot cylinder walls, etc., thus baking down to stickly carbon deposits.
3. The use of too great quantities of oil which has the same effect as the use of too heavy an oil as far as the carbonization is concerned.
4. The failure to provide a proper screen over the air intake of the compressor, thus allowing free entrance of dangerous dust, especially coal dust.

The objections to this carbonization aside from the sticking of air valves and choking of the air passages is the menace of fire entailed by carbon deposits. If such incandescent carbon particles should happen to come in contact with "oil vapor" given off by the lubricating oil, a fire might possibly be started whose menace would be small or large depending upon how much carbon had been allowed to accumulate in the compressor and piping to the receiver. If these are kept properly cleansed at all times there should never be a time of any danger.

Heat of Air Compression

The selection of an air cylinder lubricant is, of course, governed to a considerable extent by a knowledge of cylinder temperature it must withstand. Knowing the air pressures, the corresponding temperatures are ascertained fairly accurately, as shown in table 1. This table gives the final temperature in the cylinder at the end of the compression stroke, for single stage, also for two stage, or compound compression, when the free air entering the cylinder is 60 deg. Fahr.

Paraffin Base Lubricating Oils

Merely as a guide to aid the operator in specifying the qualities to be possessed by an air cylinder lubricant recommended for average duty, table 2 is presented.

It is suggested that those oils within the range expressed by the minimum figures be used for light duty of low-pressure and temperatures, while those expressed by maximum figures should be used for high pressures and temperatures.

It is recommended that any paraffin base lubricant intended for use in all standard air compressors should meet the physical tests imposed by the average range of figures given in the middle column of table 2, Standard air compressors is to be interpreted as including the following types of machines:

a. Low pressure up to 100 lb. compressors, which may be either small sized single stage units, or larger sized compound machines.

b. High pressure compressors which are constructed with the proper number of stages so that no excessive temperatures are ever reached.

In other words, this lubricant of average test figures is always recommended unless a compressor manufacturer specifies in his literature that a high flash point oil should be used to meet the conditions peculiar to his machine. It is thus obvious that it is never necessary that a lubricant should possess a flash point as high as 500 deg. unless abnormal conditions of high temperature prevail. Such high flash point oils have an unusual tendency to produce carbon deposits.

Asphaltic-Base Lubricating Oils

This group of oils is considered separately for the reason that the lower limit of gravity stated in table 2, 25 deg. Baume, eliminates this entire group from consideration, which is not the intention of this article.

Table 2—Physical Tests of Paraffin Base Oils

	Minimum	Average	Maximum
Gravity, Baume	28-32° F.	25-30° F.	25-27° F.
Flash point, open cup	375-400° F.	400-425° F.	425-500° F.
Fire	425-450° F.	450-475° F.	475-575° F.
Viscosity (Saybolt) at 100° F.	120-180 sec.	230-315 sec.	to 1500 sec.
Color	Yellowish	Reddish	Dark red to Green
Congealing point (pour test deg. F.)	20-25° F.	30° F.	35-45° F.

As a guide for the selection of suitable oil, table 3 is given.

For general all around use, it is conceded that the recommendations given in tables 2 and 3 cover the situation as well as possible, special cases, of course, requiring investigation and special consideration before making recommendations.

Proper Quantity of Lubricating Oils

The quantity of lubricating oil to feed to the air cylinders of compressors cannot be stated in exact terms due to the varying viscosity of different oils, the heat of compression and the size of cylinder. It may be stated in general, however, that after the cylinders have acquired smooth and polished surfaces, the quantity should be reduced to the lowest limit to avoid the

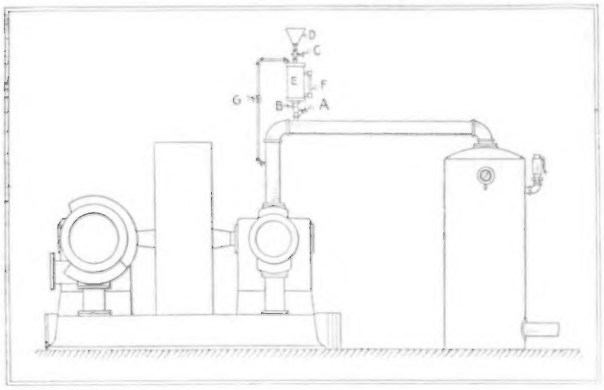
*From a paper prepared for the Compressed Air Society, New York. The article is the result of a study made by the technical committee of the society, of which the author is secretary.

possibility of the accumulation of carbon and sooty deposits within the system due to excessive use.

The following basis of quantity given in table 4 is recommended, subject to above modifications for these cylinders or equivalent sizes, operating under normal conditions.

The results in the last column of table 4 are based upon the assumption that under average conditions of temperature and usual range of oil viscosities, a pint of oil will contain an average of about 16,000 drops. These figures are offered merely as an approximate guide, as every individual must exercise his own judgment in modifying them wherever his own particular set of working conditions is unusual.

A leading authority on compressor engineering contributes the following: "The best way to determine the proper amount of lubrication is to take out the valves from time to time and examine the cylinder. All parts should feel that there is oil thereon. If they feel dry the lubricators should be adjusted to feed a little more oil, whereas if oil lies in the cylinder and its parts show excessive oil thereon, the quantity fed by the lubricators should be reduced. By thus examining the machine a few times the proper amount of oil can be determined to suit the characteristics of the particular lubricant used and the conditions under which the machine



Device for Cleaning Carbon in Air Discharge Line and Receiver of Air Compressors. To use the compound, close pressure cocks, A and G, open filling valve C, and fill compound through funnel D; when compound chamber E is filled, close valve C, open cocks G and A and regulate feed by valve B; use about 70 drops per min.

operates." This is a better way to finally determine the quantity of oil required than by adopting without this experimenting any tabulated number of drops.

Periodical Cleansing of System

The best of lubricating oils will cause the deposit of enough carbon in the compressor system to necessitate the periodical cleansing of it.

For the removal of carbon, the machine operator should confine his efforts to the use of soap suds. A good cleansing solution is made of one part soft soap to 15 parts water. These suds should take the place of oil for a few hours, and be fed into the air cylinders about once a week, either by means of a hand pump or through the regular lubricator at a rate about 10 times as rapidly as that of the oil. The cleanliness of the air valves when inspected, as they should be periodically, will indicate whether greater or lesser applications of the soap suds should be made. After using soap suds, open the drain cock of the air receiver, and of the intercooler in the case of compound machines, to draw off any accumulated liquid. Oil should be used again for a half hour before shutting down the machine in order to prevent rusting the cylinder and its fittings. Never use kerosene, gasoline or lighter oils in an air cylinder for any purpose whatever, because of their volatile nature under heated conditions.

Table 3—Physical Tests of Asphaltic Base Oils

	Minimum	Average	Maximum
Gravity, Baume	20-22° F.	19.8-21° F.	19.5-20.5° F.
Flash point, open cup	305-325° F.	315-335° F.	330-375° F.
Fire	360-380° F.	370-400° F.	385-440° F.
Viscosity (Saybolt) at 100 deg. F.	175-225 sec.	275-325 sec.	475-750 sec.
Color	Pale yellow	Pale yellow	Pale yellow
Congealing point (pour test)	0° F.	—0° F.	—0° F.

Cleaning Air Receiver and Piping

A practical method of cleaning air discharge lines and air receiver is shown in the cut, where a receptacle made of 6-in. pipe is shown set on top of the discharge pipe. The cut shows the construction and what the different parts represent. If a mixture of 1 lb. of Red Seal lye and 18 lb. of water is passed into the discharge line at the rate of 60 or 70 drops per min., while the compressor is running, this will eat out all the accumulation on the surface of the pipe and in the receiver, and if the blow-off valve on receiver is open, all of this foreign matter will be discharged therefrom. This cleaning solution can be used every month or two, or depending on how much accumulation there may be in the receiver.

Table 4—Quantity of Air Cylinder Lubricant Required per 10 hr. Day

Diameter of Cylinder in Inches	Size of Cylinder in Inches	Displacement per min. in cu. feet	Piston Speed, per min.	Sq. ft. of Cylinder Wall Swept by Piston	Drops Oil per min.	Drops Oil per 10 hr.	Sq. ft. Oiled per Drop	*Number Pints Oil Required per 10 hr.
8	8 x 8	120	344	718	1	600	718	0.0375
12	12 x 12	320	408	1230	2	1200	613	0.0750
18	18 x 18	880	496	2340	4	2400	585	0.1500
24	24 x 24	1730	550	3450	6	3600	575	0.2250
30	30 x 30	2940	600	4700	8	4800	590	0.3000
36	36 x 36	4550	644	6070	10	6000	607	0.3750
42	42 x 42	6700	696	7600	12	7200	633	0.4500

*Figures in last column are based upon an estimated 16,000 drops per pint of oil at 75 deg. F.

Steam Cylinder Lubrication

The proper quantity of oil to be fed to steam cylinders is much greater than to air cylinders due to the constant washing away of the oil by the steam. Approximately four times as much oil will be needed in the steam cylinders as in those for air, subject, of course, to variable local conditions.

Depending on its viscosity, a pint of steam cylinder oil will furnish from 5000 to 8000 drops, and taking an average of about 6500 drops, and four times as much oil as air cylinders of same size, and working at same piston speeds, as given in table 3, the recommended amounts to feed the steam cylinders or their equivalents are given in table 5.

Table 5—Quantity of Oil for Steam Cylinder Lubrication

No. Drops per min.	Size of Cylinder in Inches	Number Pints Oil Required per 10 hr.
4	8 x 8	0.40
8	12 x 12	0.75
16	18 x 18	1.50
24	24 x 24	2.25
32	30 x 30	3.00
40	36 x 36	3.75
48	42 x 42	4.50

These figures are approximate only, and will vary with the steam conditions, the kind of oil used, and its method of introduction into the steam, also with the boiler compound carried by the steam into the cylinder.

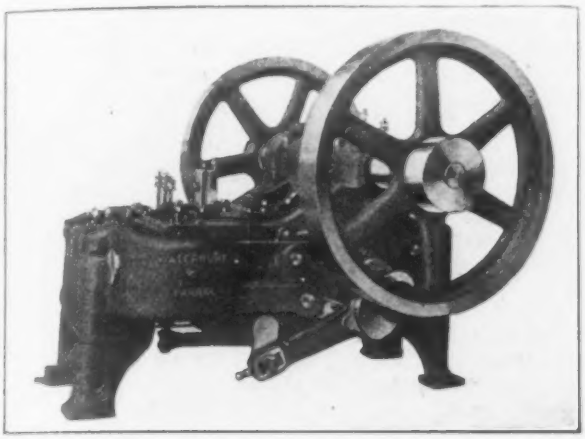
Electric Welding Machine for Small Shops

An electric welding machine built expressly for the smaller machine shops and garages has been placed on the market by the Arcwell Corporation, 42 Broadway, New York. It differs from the company's standard machine, in that its capacity is not sufficient to take care of heavy work on a basis of speed. It will, however, do any of the work now being done by the standard machine, the only objection to its use in this respect being in the time consumed per operation. The machine is intended for the use of those individuals who have intermittent welding to do, whether on production or reclamation work. It is built for operation on alternating current of any specified voltage or frequency.

New Open Die Double Stroke Rod Header

A new machine designed as an open die, double stroke rod header has been placed on the market by the Waterbury Farrel Foundry & Machine Co., of Waterbury, Conn. It is used for heading or upsetting either one or both ends of rods or pieces up to ¾ in. in diameter and of lengths greater than 6 in. which have been previously straightened and cut off to the desired lengths in another machine.

The header runs continuously with the exception of the mechanisms which operate the shifting of the punches, actuating the stop gage, and the opening and closing of the gripping dies. These motions are operated by engaging the clutch by a foot treadle. The



Continuous Running of the Driving Shaft and Heading Gates with the Punch or Punches Serves to Give This Machine High Rod Heading Power

continuous running of the driving shaft and the heading gate with the punch or punches gives a high heading power.

In the operation of the machine blanks or rods to be headed are placed by the operator between the open dies against an adjustable stop gage. Depressing the foot treadle engages the clutch that actuates the mechanism for closing the dies which securely grips the rod with a sufficient length projecting beyond the face of the dies to form the required head. The stop gage is positively swung to one side, clearing the punches as they elevate and advance in alignment with the dies. After the head is formed the punches return and lower to a position below the heading line. The dies then open and the work is free to be removed with the stop gage again brought into a position ready to give the correct location of the next rod fed.

A one revolution clutch is furnished which prevents the operator from repeating the heading operation on the work unless the foot treadle is again depressed. By furnishing the correct ratio of gearing the machine can be supplied to strike one, two or three blows to form an upset.

Army Gas Mask of Little Use in Industry

Last year the Bureau of Mines, Department of Interior, Washington, received many inquiries regarding the use of Army gas masks in industries for protection against poisonous and irritating gases. These inquiries show a general belief that this type of mask will protect the wearer under all conditions against any gas whatsoever, even in absolutely irrespirable air, to the exclusion of the more cumbersome mine-rescue breathing apparatus. This erroneous belief will no doubt be further confirmed by discharged soldiers, who have been trained in the use of the gas mask and have been taught that it gives them absolute protection against all gases used or likely to be used in warfare. These men will not realize that out in the open air of the battlefield the percentage of gas in the air can never be near as large as in confined factory spaces.

A mask may afford complete protection under outdoor conditions and break down at once when used indoors where a gas container has burst and filled the room with a greater concentration of gas. It must also be remembered that the absorbents in the army respirator, which filter out the poisonous gas, are specially designed for the gases used in warfare, and as a matter of fact do not protect against the more common industrial gases as, for example, illuminating, natural, producer and blast-furnace gas.

The Army gas mask is by no means the unusual protective appliance that it is popularly believed to be. It does not afford protection against all gases, nor can it ever be used safely in low oxygen atmospheres. It furnishes no oxygen to the wearer and can only remove comparatively small percentages of poisonous gas from inhaled air, usually less than 1 or 2 per cent. Higher percentages will immediately penetrate the canister and "gas" the wearer.

The Army mask, also, furnishes no protection whatever against carbon monoxide, the poisonous constituent of blast-furnace, producer and illuminating gases. The bureau is working on a carbon monoxide mask, but it is not now available.

On account of the urgent need for a dust-removing respirator for safeguarding the health of workmen in mining and metallurgical industries the bureau has undertaken a study of such devices with a view to developing a satisfactory model.

In connection with the Bureau of Mines' work of safeguarding the health of workmen in metallurgical industries, an investigation of respirators, gas masks and breathing appliances is being undertaken at the Pittsburgh Experiment Station. This will be conducted by experienced chemists and engineers who had charge of gas mask research in the bureaus' war gas investigations and subsequently in the Research Division of the Chemical Warfare Service of the Army.

The industrial respirator investigation will include:

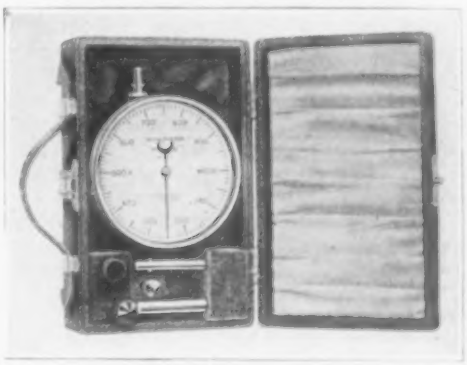
(1) Advice on the suitability of the standard army gas mask for use in various industrial gases.

(2) Approval of industrial gas masks and respirators when properly submitted to the bureau by the manufacturer in accordance with a schedule to be announced later.

(3) Instruction of workmen at plants in the use of masks and respirators in a manner similar to that now being given by the bureau in the use of oxygen breathing apparatus.

New Hand Tachometer

A portable tachometer for registering instantaneously velocity of rotation, and designed to fit in the palm of the hand, has been developed by Jones-Motrola, Inc.,



Portable Hand Tachometer with Uniform Scale

29 West Thirty-fifth Street, New York. It operates on the centrifugal principle and has a uniform scale the same as the company's larger instrument designed for permanent installation. The dial is 4 in. in diameter and has figures of a size easily read.

The tachometer is supplied with a set of couplings, triangular steel tip, center punch, rubber tip, rubber funnel cup for pointed shafts, and extension rod. It is finished with black japanned body, and nickel-plated trimming. The instrument, together with couplings and other equipment, is packed in a morocco carrying case. It is made in three standard sizes, No. 1, 100 to 1200 r.p.m.; No. 2, 500 to 2500 r.p.m., and No. 3, 1000 to 5000 r.p.m.

FREIGHT CAR SUPPLY IMPROVED

Does Not, However, Justify Halt in Intensive Loading—Record of Steel Corporation

BY J. FRED TOWNSEND*

The improved car supply which exists at the present time has been brought about not only by the favorable weather conditions that prevailed throughout the mild winter, but by the lull in business following the signing of the armistice. These two conditions, with the heavier loading of cars the propaganda for which has had the valuable aid and support of many shippers of steel products located in the Pittsburgh-Wheeling, Youngstown, Cleveland-Lorain, Birmingham and Chicago districts, have combined to effect so marked an improvement that it may be thought it is less necessary to load cars to full carrying capacity. However, it should be borne in mind that a return to the old practice of light loading would speedily bring about another car shortage and congestion by reason of the increased number of cars necessary to carry a given tonnage.

Many shippers have volunteered the information that it is their purpose to continue to make the fullest use of equipment, maintaining records established during the war, regardless of the minimum prescribed by the tariffs, realizing apparently the advantages gained in preventing useless waste and a return to the transportation conditions which formerly prevailed.

The United States Railroad Administration, through its Car Service Section, recently issued an appeal to the shipping public, inviting attention to its accomplishments and policy with regard to freight car conservation, urging shippers to continue their efforts toward bringing about improved transportation conditions and pointing out that the co-operation of shippers has been a very material factor in compassing the following ends: 1. An increased car supply. 2. Lessened congestion on the railroads, particularly at terminal points. 3. Improved service made possible by such lessened congestion.

Average Carload of 91,500 Lb.

In this connection, it is interesting to know that the 13 shipping companies of the United States Steel Corporation have conducted a vigorous campaign for the heavier loading of cars, and during the year 1918 their carload shipments averaged 91,500 lb. per car. This is a remarkable showing when the fact is taken into consideration that the average marked capacity per freight car in this country is only 80,000 lb., and the average carload of all railroads throughout the country on all shipments, including the traffic referred to, was only 58,200 lb. per loaded car, or an average of 33,300 lb. per car less than the record made by the subsidiary companies of the Steel Corporation.

While the 13 shipping companies referred to increased the average carload on outbound shipments during the year 1918 only 3600 lb. per car, there was effected an actual saving of 63,828 cars, as compared with the loading for the year 1917, when the average lading was 87,900 lb. per loaded car. This does not include the thousands of cars loaded with iron ore by the Oliver Iron Mining Co.—also a Steel Corporation subsidiary—in its shipment of millions of tons forwarded during the year, all of which were loaded to the average of 50 tons per car. To include these would have tended to increase the average load, but would have been misleading.

Great Saving in Car Miles Effected

Taking the average haul per ton of revenue freight throughout the country of the individual railroad as 166 miles, and the loaded freight cars per train as 25 cars, the railroads in the United States were saved 10,595,448 car miles, or 423,818 train miles. The use of 63,828 fewer cars than the year before means that that equipment was in other service; at the average freight revenue of 16.13c. the saving of that number of cars actually resulted in increased earnings to the railroads of $1,709,046 without any increased operating expense.

Using the American Railroad Association's method of counting every day in the life of a freight car as a "car day," the 63,828 cars saved by the 13 shipping companies of the U. S. Steel created during the year 23,297,220 car days, and placing the average earnings of a freight car at $2.50 a day, and multiplying the number of car days by the average daily earnings, it is found that in 1918 the railroads gained $58,243,050 in gross earnings by reason of the heavier loading of cars by these companies. That the 63,828 cars saved were actually in other service is attested by the fact that there were no idle freight cars throughout the year.

Stated conversely, the 13 shipping companies actually forwarded 2,920,131 more tons of traffic than if the practice of loading one year ago had been followed, and this increased traffic was enjoyed by the railroads without any additional operating expense.

Record Compared with Seven Years Ago

During the last seven years the 13 shipping companies of the Steel Corporation have increased the average carload from 69,200 lb. per car, in the year 1911, to 91,500 lb. per car in 1918, an increase of 22,300 lb. per car, or 32 per cent, thereby effecting a saving of 339,736 cars through the heavier loading of equipment, a record unmatched in this country.

The railroads, consignees and shippers themselves have been greatly benefited through the reduced number of cars switched and weighed, to say nothing of the relief from congestion on the railroads, particularly at terminal points, improved service made possible by lessened congestion, and the great saving in operating expenses that was brought about by the fewer cars, both empties and loads, that were kept out of the various classification and interchange yards of the railroads from point of shipment to destination.

The record achieved by the Steel Corporation subsidiaries proves conclusively the real value of conserving freight car equipment at all times, and if shippers generally would note the enormous saving in equipment that has been created with only a 32 per cent increase in the average load in a period of seven years, they would get some conception of what could be accomplished if all of them would adopt the Railroad Administration's rule of loading to 10 per cent above the stenciled capacity, or firmly fix the rule to load to 100 per cent of the carrying capacity whenever possible.

*Traffic manager National Tube Co., Pittsburgh.

Secretary Redfield Intervenes

WASHINGTON, March 18.—Secretary Redfield of the Department of Commerce has raised an interesting precedent by intervening in the complaint of the Solvay Process Co., Solvay, N. Y., to prevent the United States Railroad Administration and the Delaware, Lackawanna & Western Railroad Co. from raising the freight rate on stone from Jamesville to Solvay from 15 to 30c. per ton.

Secretary Redfield takes the position that it is his duty to protect commerce of every kind in the United States against unnecessary difficulties. He bases his action on the testimony that the increase in this case is made purely because of the Railroad Administration's need of greater revenues and that the original 15c. rate was a profitable one.

Whether the Secretary of Commerce has the right to intervene in such questions is a question which the Interstate Commerce Commission itself will have to determine. Mr. Redfield insists that the law creating the Department of Commerce gives him full power to intervene in cases of this kind.

A leading German paper learns from industrial circles that Germany is threatened with a scarcity of pig iron, says the London *Iron and Coal Trade Review*. In 1913 the country produced 19,210,000 tons, but during the war the output declined to between 11,000,000 and 13,000,000 tons. Under the terms of the armistice 144 of her 469 blast furnaces are now controlled by the Allies.

Earnings of Iron Companies in War Time

Showing for Last Year Not as Favorable as for 1917—Chairman Topping of Republic Iron & Steel Co. Takes Optimistic View—President Lemoine's Interesting Comment

OF UNUSUAL interest are the reports of iron, steel and machinery companies for the past year, reflecting, as they do, war conditions. Most of them show marked decrease in net earnings.

Sloss-Sheffield Steel & Iron Co.

The use of lower grade ores in the Southern furnaces, the higher labor rates and less efficiency, together with an extreme advance in raw material freight rates, are the causes attributed for the lower earnings of the Sloss-Sheffield Steel & Iron Co. for 1918, according to the annual report just issued. Surplus, after all charges and Federal taxes, amounted to $1,972,071 for the past year, compared to $2,152,373 of 1917, or an equivalent per share on the $10,000,000 common stock of $15.03 against $15.78 of the year before. From the operating profits of $6,195,527, the sum of $2,502,959 was deducted for the loss due to the war-time construction of 120 by-product coke ovens, contracted for by the Government to supply toluol and ammoniacal liquor, and canceled six months later.

The report compares the output of 1918 with the average output of the two preceding years, pig iron totaling 387,497 tons against the average of 475,000; ore, 844,185 tons contrasted to approximately 1,000,000; coal, 1,568,019 tons against about 1,900,000; coke, 585,413 tons compared with 600,000.

The Government raised the scale of common labor in many cases 100 per cent. Following this the Railroad Administration fixed the scale for such labor in an amount showing an additional advance of about 100 per cent. Later the War Labor Board made an award against raising the rate of certain labor another 100 per cent. To quote the report: "Never has there been in the history of your company a more unsatisfactory condition of labor as to its scarcity, its wage, and its efficiency. The chaotic conditions created brought about not only a scarcity but a migratory condition of labor which resulted in demoralization, indifference, and inefficiency."

The report continues:

"Owing to the demands of the Government expressed by the Directors of Steel Supply that the furnaces of your company be worked to capacity in order to produce the greatest possible amount of iron for war essentials we were obliged to purchase some raw materials at prices considerably above the cost of production of these materials from your own properties, raising the cost of producing pig iron. Prices as regulated by the Government would have permitted a fair margin of profit during the latter part of the year, except for the labor and other conditions which, toward the end of the year, increased your cost to $32 per ton."

Over 700 employees went to war. Part of the labor scarcity was due to the large amount of Government construction work adjacent to the company's plants, particularly at Sheffield, Florence, and Russelville. The company is at present trying to get relief from the high freight rates, and endeavoring to obtain an adjustment because of the abandoned by-product coke oven construction. Waddill Catchings has resigned as chairman of the board and has been elected chairman of the executive committee.

Republic Iron & Steel Co.

Total profits of the Republic Iron & Steel Co. for 1918 were $18,906,814, which is nearly $10,000,000 less than those of 1917 and over $2,000,000 more than in 1916. The reduction from 1917 is attributed to Government price regulation, inadequate transportation, and a shortage of fuel and labor, with a 40 per cent increase in wages for the latter. The net profits, after deductions for taxes, depreciation, inventory shrinkage, etc., were $8,530,116. The net addition to the surplus was $4,410,473, making the combined surplus at the end of the year a total of $35,122,467, while the net working assets on the same date were $28,729,968.

Comparative Statement of Income

	Year Ending Dec. 31, 1918	Year Ending Dec. 31, 1917	Year Ending Dec. 31, 1916
Net earnings from operations, after deducting charges for maintenance and repairs of plants, amounting to:	$18,177,046.85	$28,329,718.46	$16,544,635.61
Dec. 31, 1918, $5,147,442.76			
Dec. 31, 1917, $3,559,157.62			
Dec. 31, 1916, $2,138,373.38			
Interest and dividends received	729,767.82	439,302.93	348,576.51
Total profits for the year	$18,906,814.67	$28,769,021.39	$16,893,212.12
Less:			
Provision for depreciation and renewal of plants	$4,183,319.07	$1,999,760.26	$1,000,090.61
Provision for exhaustion of minerals	512,619.78	274,072.31	245,221.95
Provision for excess profits tax, etc., and other contingencies	5,680,759.44	9,878,657.30	
	$10,376,698.29	$12,152,489.87	$1,245,312.56
Net profits for the year	$8,530,116.38	$16,616,531.52	$15,647,899.56
Deduct:			
Interest on bonds and notes	738,182.44	759,334.67	858,736.79
Net profits applicable to dividends	$7,791,933.94	$15,857,196.85	$14,789,162.77
Add:			
Surplus Dec. 31, 1917	$30,711,988.28		
Surplus Dec. 31, 1916		18,236,251.43	
Surplus Dec. 31, 1915			8,354,953.66
	$38,503,922.22	$34,093,448.28	$23,144,116.43
Deduct:			
Dividends on preferred stock	$1,750,000.00		
Dividends on common stock	1,631,460.00		
Dividends on preferred stock		$1,750,000.00	
Dividends on common stock		1,631,460.00	
Dividends on preferred stock			$4,500,000.00
Dividends on common stock			407,865.00
	$3,381,460.00	$3,381,460.00	$4,907,865.00
Net surplus carried to balance sheet	$35,122,462.22	$30,711,988.28	$18,236,251.43

The output of each product was less in 1918 than for the preceding year with the exception of open-hearth steel ingots. The tons produced follow: iron ore, 1,512,071, gross; coke, 1,207,896, net; limestone, 78,777, gross; pig iron, 1,030,411, gross; Bessemer steel ingots, 615,970, gross; open-hearth steel ingots, 503,732, gross; total steel ingots, 1,119,702, gross; finished and semi-finished products, 1,024,040, net.

The gross volume of business for the past year amounted to $75,224,110, comparing with $78,325,461 in 1917, and only $52,844,017 in 1916. Additions to the property account during the year aggregated $5,333,697, the total new construction to Dec. 31, 1918, being: blast furnaces, $10,066,822; steel plants, rolling mills, and factories, $18,466,683; ore and coal mines, coke ovens, and quarries, $10,226,203; miscellaneous, $294,413; total, $39,054,122.

Blast furnace improvements included additional

switching locomotives, modern appliances for burning furnace gas and improved air heads, etc., on the blowing engines; relining of four blast furnaces which had been in continuous operation for four years or longer; installation of new boilers at Hannah furnace. At the Bessemer steel plant, a 1000-kw. motor generator set with power line to the central power plant at Haselton furnaces was installed. At the open-hearth works, two open-hearth furnaces with collateral equipment were completed; a water purifying plant, hot saws, air compressors, cranes and buildings for handling the special steel for the Government were placed. A modern fireproof steel and concrete tipple and washer have been installed at the Sayreton mine, near Birmingham, to replace that destroyed by fire in December, 1917. Work on the new slope, tipple and washer at the Palos mine, near Birmingham, is nearly completed.

The total number of employees who enlisted in the Army or Navy was 1681. The average number of men employed during the year was 14,668, compared to 14,510 in 1917 and 13,056 in 1916. The average wage per man in 1918 was $1,619, contrasted to $1,211 in 1917, $979 in 1916, and $771 in 1915. The total expended for labor in 1918 was nearly four times that in 1915.

Chairman John A. Topping states: "It is gratifying to state that your company emerges from the war period in a condition of such strength that the problems of readjustment may be considered with confidence."

Conditions of Pipe Business

"Probably never again will railroad transportation, labor conditions and the complete disruption of the markets for your raw materials present such a constant array of prodigious problems," states L. R. Lemoine, president United States Cast Iron Pipe & Foundry Co., in his 1918 report to stockholders. "With the lifting of the ban on public improvements," he continues, "it is but natural that some time should elapse in overcoming the inertia resulting from so many months of activity; but the tonnage thus dammed up because of war conditions must come out eventually. Indeed, some of it is already in evidence. Urgent water supply needs here and there are forcing some tonnage on the market and more of it will come as the season opens.

"Labor unemployment may also cause municipalities to release some tonnage very soon, so that the near future promises a considerable tonnage, and your management confidently believes that with the gradual readjustment to more normal conditions there will be a substantial demand for your products.

"Not a few of your older employees own homes adjacent to your works and have proved themselves more than faithful during all the difficulties you experienced as a result of war conditions. As to other labor, chiefly that representing the turnover during the war, it seems as though it might be said that labor 'profiteered'. Labor is beginning to appreciate that the law of supply and demand affects it, as well as the value of things produced or exchanged. As more normal conditions return, there will obtain lower values in things produced and wages earned, and on these lower levels labor well employed will find it is relatively better off than, per contra, it is on the present high wage levels with few jobs. Your managers are trying to help your employees appreciate the value of honest effort; to prove to them the value of vigor, vim and vision; that their personal equation and initiative count; and that in a sense they are partners in a going concern in which service will be fairly compensated."

Net earnings in 1918 were $1,109,036 as compared with $1,342,140 in 1917, of which the president states: "Considering the unprecedented conditions of the past year, may be regarded as satisfactory." In the general foundry and machine department, full capacity was used in turning out heavy castings and equipment for the Government. One of the plants was devoted to experimental work in, and development of, semi-steel shell. Earnings partly accrued from shipments of pipe carried in stock at low inventories rather than from the reduced current make of pipe at high cost levels; partly from output of heavy castings, miscellaneous work and fittings, large and small. Present stock of raw materials and pipe stands at a minimum. Just prior to the signing of the armistice practically all pipe was for war purposes.

During the year no new construction was started, though work started in 1917 was completed. Costs for repairs to buildings, machinery, pipe equipment, tool repairs, replacements, and minor improvements amounted to $860,359, or about 18 per cent less than for the preceding year. Net working capital at the end of the year was $5,140,484, compared with $3,906,803 for 1917.

Railway Steel Spring Co. Issues Report

Net earnings of the Railway Steel-Spring Co. for 1918 totaled $8,019,020, with a surplus for the year of $1,704,849, as compared with $8,657,800 of the year before. Dividends were paid at the rate of 7 per cent on the preferred stock and 5¾ per cent on the common. The report gives out the following concerning the future: "The company has orders on its books covering deliveries several months ahead, a large percentage of which is for export to foreign countries. It is expected that business throughout 1919 will be in good volume at a fair level of prices and will readily absorb such raw materials as have been acquired at prevailing prices to meet the necessary demands of the business."

Though gross earnings were higher by $1,278,317 than in 1917, net earnings of the Railway Steel Spring Co. for 1918 were about 25 per cent less, according to the annual report. The surplus after all charges and Federal taxes for 1918 was $3,426,099, or $18.37 a share, on common stock after preferred dividends, against a surplus of $4,307,860, or $24.91 a share, in 1917. Lessening of net earnings was due to the big jump in expenses, depreciation, etc., from $14,806,746 to $17,163,012 in the year just past. The company has orders on its books covering deliveries several months ahead, a large percentage of which are for export.

Bethlehem Steel Earnings

The fourteenth annual report for 1918 of the Bethlehem Steel Corporation, dated March 17, 1919, shows total net earnings from operations, after deducting taxes and expenditures for repairs and maintenance, of $57,188,769. Of this amount there remains after deducting interest charges and expense of bond and note issues the sum of $47,440,756. A total of $31,510,366 has been provided for depreciation, amortization and depletion, leaving a net income of $15,930,390, a decrease of $11,390,346 from 1917.

Salaries and wages amounted to $167,118,484, very nearly twice the sum paid out the year before. The volume of business, represented by gross sales and earnings, was the largest in the company's history, the figures being $448,410,808. With the completion of the steel plant at Sparrows Point, Md., which will make productive an investment of upward of $50,000,000, the corporation will have an annual capacity of over 3,000,000 tons of steel ingots, with finishing plants of sufficient capacity to convert the entire tonnage into commercial products.

The corporation made 60 per cent of the finished guns turned out by the United States during the war, 65 per cent of the gun forgings, and 40 per cent of the complete ammunition. Figures of war products are as follows: Finished guns, 3570; finished gun carriages, limbers, caissons, etc., 7582; finished naval gun mounts, 599; forgings for guns, 63,027,197 lb.; complete field gun ammunition, 18,477,876 rounds; projectiles for ammunition, 1,710,579; air flask forgings for torpedoes, 9,527,311 lb.; armor plate, 69,409,533 lb.; shell steel, 897,178 gross tons.

The Tuesday luncheon addresses to be held in the early future by the Engineers' Club of Philadelphia include one on April 15 on "The Participation of Engineers in Public Affairs," by Morris L. Cooke, and one on April 22, on "A Broader Type of Training for Engineers," by Prof. George B. Pegram, School of Mines, Columbia University.

Strange Defects in Nickel Gun Forgings

Cause and Nature of Flakes as Determined by Macroscopic and Microscopic Study—Effect on Physical Properties of the Steel

A DEFECT in steel, which is comparatively new, was the cause of much serious trouble in the development of the American ordnance program in the last few months of the war. These defects occurred almost entirely in nickel steel made as ingots for conversion into large guns. The name given to them was "snow flakes" or "flakes."

Considerable attention was bestowed on this problem at the February meeting of the American Institute of Mining Engineers at New York, Feb. 17 to 20 and two important papers dealt with the subject. One was "Microstructural Features of Flaky Steel" by Henry S. Rawdon, associate physicist, United States Bureau of Standards, and the other was "Flakes and Woody Fractures in Nickel Steel Gun Forgings," by C. Y. Clayton, consulting metallurgist, United States Bureau of Mines, F. B. Foley, metallurgist, United States Bureau of Mines and F. B. Laney, geologist, U. S. Geological Survey. Abstracts of these two papers follow:

Microstructural Features of Flaky Steel

FLAKES do not appear to be found in the plain carbon steels; they have been found, however, in abundance in some of the simple alloy steels that are being used in such vast quantities, as nickel steel of the approximate composition, 0.40 carbon and 3.5 per cent nickel, and in the chrome-nickel type.

Microstructure

To one familiar with flaky steel, the appearance of "snow-flakes" is unmistakable and is not to be confused with other types of defects. Figs. 1, 2 and 3 show the appearance of fractures of steel showing this type of defect; the white silvery area, which always has the appearance of being of a very coarsely crystalline structure, in the specimen stands out in bold contrast to the darker background and justifies the term "snow-flakes." Fig. 1 shows the appearance of the faces of the two halves of a nickel-steel forging that has been split to show the interior flakes. Fig. 2 is a nickel-steel bar (carbon, 0.40 per cent; nickel, 3.62 per cent; chromium, 0.35 per cent not intentionally added) intended for use in the manufacture of a propeller shaft.

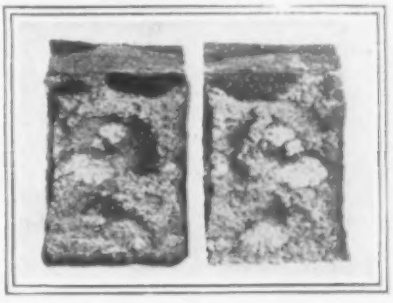


Fig. 1—Nickel-Steel Forging Split to Reveal Flakes. × 1

In the examination of material for the detection of flakes, the specimens are often nicked and broken under impact; unless the steel has a very fine grain the contrast between the coarse face of the flake and the surrounding metal may not be very marked. The best procedure is to refine the grain by properly hardening the piece before breaking. The flakes will then appear as coarsely crystalline areas surrounded by the smooth porcelain-like fracture of the surrounding sound metal. Fig. 3 shows such a fracture of the material of Fig. 2 after so hardening. The area designated as the flake always has an appearance suggesting a coarsely crystalline structure. The crystals, however, are markedly different from those of the remainder of the fracture—no sparkling cleavage planes are to be found; instead the corners and edges of the crystals are rounded and smoothed and the surfaces often have a very fine matt finish. They have the appearance of crystals that were squeezed together while soft and plastic and yet failed to adhere firmly to one another. The same type of break is obtained by fracturing a bar by the action of alternating or by the application of repeated stresses. When viewed in cross-section the flakes are often found to

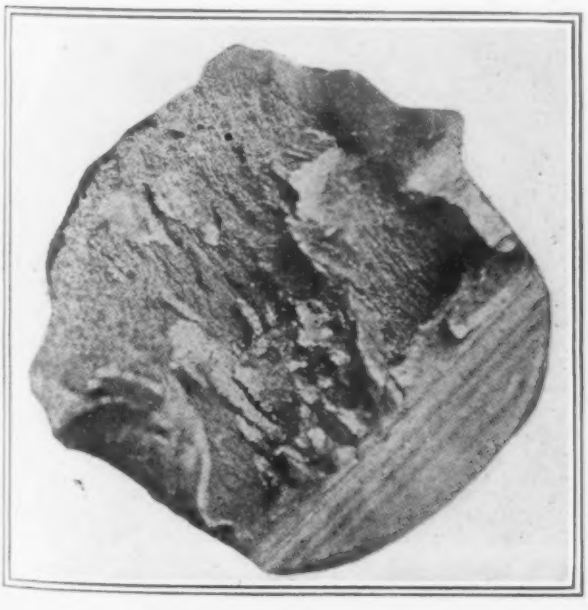
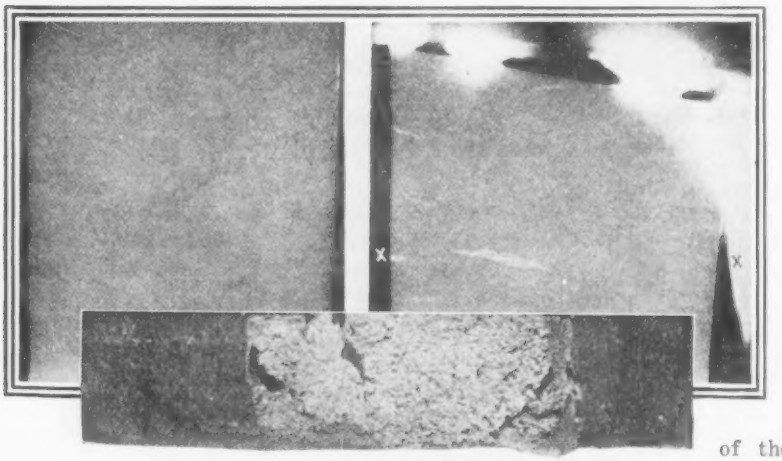


Fig. 2—(Left) Chrome-Nickel Steel Bar, C, 0.40; Ni, 3.62; Cr, 0.35 per Cent that Has Been Nickeled and Broken to Show Flakes. × 1. Fig. 3—Material Similar to that of Fig. 2, that Has Been Hardened and then Broken. × 1



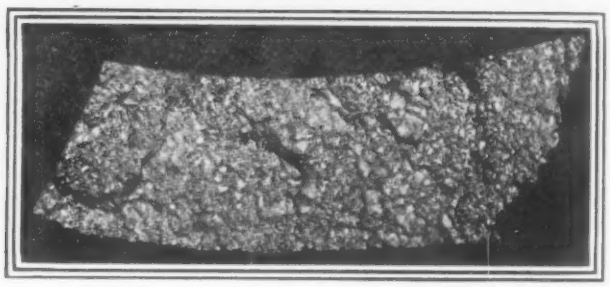


Fig. 4—Radiograph of Bar of Sound Nickel-Steel ⅜ In. Thick. Fig. 5—Radiograph of Similar Bar of Flaky Nickel-Steel; each White Transverse Line Marks Location of a Flake. Fig. 6—Cross-Section of a Bar of Fig. 5, Broken Along the Line x-x in Radiograph. × 2. Fig. 7—Fracture of Defective Chrome-Nickel Steel Showing Conditions within Ingot. Sample was from 30-in. ingot about 5 in. from center; natural size

have a rather definite and at the same time symmetrical arrangement.

What the X-Ray Reveals

The examination of steel suspected of being flaky by means of X-rays is of instructive interest and throws some additional light on the nature of the defect. Figs. 4 and 5 show radiographs of a sound ⅜-in. (9 mm.) bar of steel carbon 0.41, chromium 0.106, nickel 2.85 per cent, and a specimen of very similar composition, carbon 0.37, chromium 0.010, nickel 2.83 per cent, but suspected of containing flakes. These bars were cut transversely out of finished gun forgings of the approximate composition given. Each white transverse line in the second radiograph, Fig. 5, indicates the location of a flake as was shown by sawing in from the sides of the line x — x and breaking the specimen along the line. The large flake shown in Fig. 6 was revealed in this manner. The white lines marking the location of the flakes indicate discontinuities in the metal along these lines due to the metal being more transparent to the rays along these planes.

Microstructure of Flakes

When a section of flaky steel at right angles to the general plane of the flake is examined after properly polishing and etching, it is seen that the metal bordering the flake is normal in its structure up to the immediate face of the separation; that is, the flake has no depth. The flake appears as a discontinuity in otherwise normal material. After quenching, the metal is hardened uniformly throughout, the coarsely crystalline appearance noted on the face of the flakes in such material, Fig. 3, is a surface configuration only—the real grain of the metal constituting the flake is refined to the same degree as elsewhere in the specimen. The discontinuity in the metal, which in the fracture appears as the flake, is an intercrystalline one. In a billet of chrome-nickel steel before receiving any heat treatment whatever, the course of the flake follows the grain boundaries. The presence of flakes in the billet was first demonstrated by polishing a cross-section of the billet. A series of interior radial cracks was found which, when broken open, had the characteristic appearance of flakes.

The results of every kind of examination of flaky steel indicate that flakes are discontinuities within the steel.

Probable Nature of Flakes

These discontinuities are often found associated with extremely thin films of slag which are either continuous or formed of tiny isolated globules. The appearance of the face of the flake to the unaided eye or when examined with a hand magnifier suggests strongly that the defect had its origin early in the history of the metal. The coarse crystals have rounded corners and faces and in general the appearance suggests plastic bodies that have been squeezed together and failed to adhere. There is no trace of the glistening cleavage faces of crystals, which are always to be found when a coarsely grained metal breaks normally, that is by an intracrystalline break. The usual symmetrical arrangement of the flakes, except in forgings of which parts have been very much displaced such as the twisted portions of crankshafts, also suggests that they were formed early in the history of the piece. The fact that the flakes are all intercrystalline in their nature also confirms this. The sectioning of large-sized blooms and of ingots has amply verified the conclusions based on observations of the finished forgings and demonstrated that the defect originates in the ingot and persists throughout the entire forging period and the subsequent heat treatment.

Although flakes have been found to be associated with slag inclusions, either as thin films or as isolated globular masses, the fact that steel is "dirty" is by no means a sure or safe criterion for condemning it as "flaky." No general statement can be made that the presence of such inclusions is a necessary condition for the formation of flakes. This condition, however, if it existed would aid very materially in their formation.

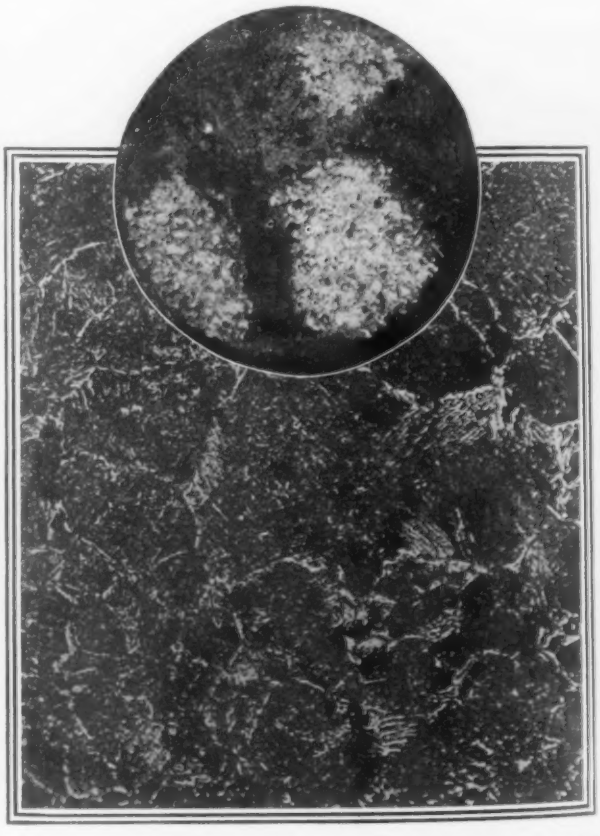


Fig. 9—(Circle) Fracture of Bar 36 in table. Silky and laminated with about 50 per cent flake. × 3½. Fig. 10—Microstructure of Bar 36 Etched with Picric Acid. Coarse network of needle-like ferrite and sorbite. Areas containing carbon shown to be in some instances sorbitic and in others approaching true pearlitic. × 260

In Fig. 7 is shown the appearance of a specimen taken from the interior of an ingot of defective chrome-nickel steel of the composition, carbon 0.40, chromium 0.55, nickel 2.75 per cent. The condition revealed in the fracture without doubt represents the initial or ingot condition of the defect, which later in the history of this piece would be designated as flakes. The dull, smooth, coarsely crystalline spots in the fractures have the appearance of metal that has failed to unite to the adjacent metal. A section through the specimen is shown in Fig. 8; the coarse dendritic structure characteristic of the cast metal is clearly shown, also some interior crevices continuous with the smooth surface areas of the fracture. These cracks occur between the fingers of the dendrites, which is the portion of the metal that is the last to solidify and contains most of the inclusions (small cut Fig. 8) and hence is the weakest part of the steel. The cracks have the same appearance as the shrinkage cracks often found in defective castings of bronze and brass. Such shrinkage cracks invariably form in the crevices between the branches of the dendrites and so far as can be judged from their microscopic appearanace these ingot cracks in steel should be considered as of similar origin.

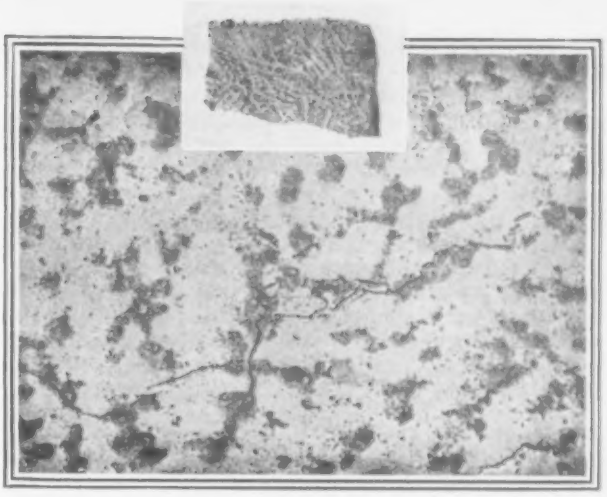


Fig. 8—(Small Cut) Section of Material of Fig. 7, Etched with 2 per Cent Copper-Ammonium Chloride Solution to Show the Dentritic Structure and Shrinkage Cracks; Natural Size. Same material (Large photomicrograph.) × 15. Interior cracks, which give rise to fracture shown in Fig. 7, occur in between the dendrites where the slag inclusions are localized

Origin of Flakes

On the whole, the microscopic appearance of flaky steel leads to the following conclusions regarding the nature and origin of flakes. They originate in the ingot, in which state they have the appearance of intercrystalline shrinkage cracks. They occur in the cast metal along with the slag inclusions in the angles between the branches of the tree-like dendritic crystals. They persist throughout the history of the forging into the finished form as discontinuities in the metal, often associated with slag films, which have resulted from the working down of the slag inclusions with which they are associated from the beginning. The coarsely crystalline appearance of the flake is a surface configuration only and is a record of the crystalline conditions, that is, the dendrites, existing in the steel at the time the discontinuity originated. Though they are usually associated with dirty steel, the converse is not true; the fact that steel is dirty or badly contaminated with slag inclusions is not a sure criterion for condemning the metal as defective because of flakes.

Flaky and Woody Fractures in Nickel Steel Gun Forgings

WOODY fracture is a term used by ordnance inspectors to describe the fracture of a pulled test bar that has a fibrous appearance and to a certain extent resembles the fracture of a piece of wood. In some instances this type of fracture has a decided "platy" appearance and occasionally careful examination will reveal more or less foreign matter, largely slag, between the plates or fibers in the fracture. The foreign matter is by no means present in all, nor even in the majority of such fractures. In fact, it was only in the beginning of the greatly increased demand for ordnance steel due to the war, when the manufacturers were making such great efforts to supply ordnance material with more or less inadequate equipment, that slag and other foreign matter were present in sufficient amount to cause trouble. This was soon remedied. The woody fractures in many cases still remained even in steel that leaves little to be desired as to freedom from sulphide, slag, and similar impurities, showing clearly that such fractures are due to a condition of the steel itself and not to foreign inclusions.

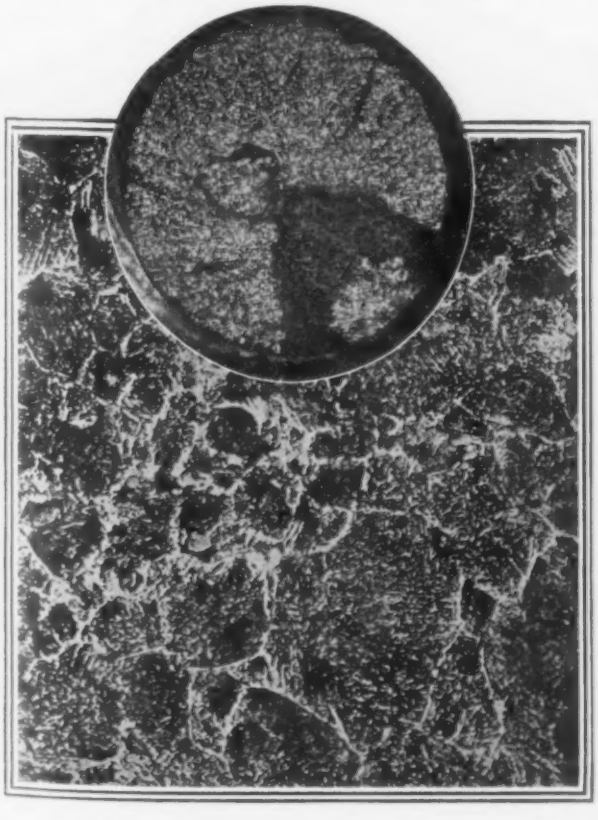


Fig. 11—(Circle) Fracture of Bar 53 in Table. About 75 per cent. fine granular and 25 per cent laminated with flake. × 3½. Fig. 12—Microstructure of Bar 38 Etched with Picric Acid. Coarse network of needle-like ferrite and sorbite, latter in certain areas converted to laminated pearlite. More free pearlite shown than in Fig. 10. × 260

Two features that appear to be characteristic of both the woody and the flaky steel are brought out when polished surfaces of the metal are etched for either macroscopic or microscopic study. Copper-bearing etch mediums, such as Rosenhain and Haughton's, Stead's, or Stead-Le Chatelier's reagents, never fail to reveal a decidedly non-homogeneous metal with large and prominent but much elongated dendrites. The microstructure, as brought out by any of the commonly used etch reagents, such as picric acid or amylic nitrate, closely resembles that of flaky steel.

To the unaided eye, a flaky fracture is any type of fracture in which occur bright, silvery spots or areas. These spots vary usually from 1/16 to ½ in. (1.5 to 12.7 mm.) in longest diameter and are surrounded by the usual gray to smoke-colored metal, which may be woody, silky, or granular, the silvery spots being the flakes, or snowflakes. A closer examination with a hand lens, or better with a binocular microscope, shows that the flake appears to be made up of more coarsely granular material than the surrounding metal and in many instances what appear to be the boundaries of polyhedral grains are distinctly visible. These are in the midst of metal of similar color or sheen but without definite crystalline structure.

All flaky steel examined microscopically showed much unmistakable evidence of overheating, and the areas or grains of sorbite were characterized by a prominent development of the Widmannstättian structure. It is probable that in transcrystalline fracture the path of rupture followed the plates of ferrite that produce the Widmannstättian structure in the grains of sorbite. Photographs of fractured ends of test bars showing typical flakes are illustrated in Figs. 9 and 11.

Flakes may be detected also by any of the usual acid etches for macroscopic examination of the metal. The flake areas are more readily attacked by the acid and they consequently etch out, leaving tiny open spaces resembling minute cracks. They are so thin that in order to develop them to the best advantage the metal must be surfaced very carefully before etching. This may be explained on the basis that the acid does not attack the flake itself but rather the metal surrounding it. From this fact it would appear that the flake differs in composition and texture from the surrounding metal.

The same areas may be detected also by etching a carefully polished surface with any of the copper-bearing solutions. This differential attack by etch mediums, together with the fact that the flakes in a fracture do not oxidize nearly so readily as the surrounding metal, indicates that the flake differs in composition from the surrounding normal metal.

Microstructure of Flakes

The one characteristic feature of flaky steel revealed under the microscope is the lack of complete grain refinement. Coupled with this and, so far as the writers' experience has extended, invariably present is unmistakable evidence of overheating, such as Widmannstättian structure in the ferrite grains and the so-called spiny ferrite bands. These features are illustrated in Figs. 10 and 12.

Bearing in mind the marked contrast between the flake and the normal metal in a broken test piece, one would expect the microscope to reveal segregations or other physical peculiarities. But only in a few instances were any such segregations found and in still fewer cases were these definitely related to flakes, and even then the relation was not such as would warrant the conclusion that the flake, as revealed in the fracture, and the segregation were identical. The microscope, in addition to showing the lack of grain refinement and the prominence of Widmannstättian structure in flaky steel, also reveals certain peculiar areas generally occurring as irregular connected zones or patches in which the grains of sorbite and the areas of ferrite are different from those of the surrounding metal. In all such instances examined the grains appear to be smaller and with possibly a little heavier precipitation of ferrite, as well as more prominent Widmannstättian structure, than the other part of the metal. These features are very difficult to describe but they are easily discernible under the microscope.

While microscopic examination does not provide an answer as to the physical nature of the flakes, it does indicate that they are caused by the rupture of small areas irregularly distributed through the metal so differing from the other metal that the rupture occurs both in the ferrite and through the sorbite along the Widmannstättian plates. It might be surmised that these areas represent places in which some non-ferrous element has segregated in the ferrite, thus making it more brittle than the surrounding metal, such, for example, as phosphorus, also lowering the temperature at which these particular areas would be overheated.

Chemical Tests of Flake Areas

It has not been possible to isolate enough metal from the flakes for quantitative or even satisfactory qualitative analysis. However, a certain amount of fairly reliable quantitative and microchemical work has been done, all of which indicates that the flake areas are higher in phosphorus and carbon than the normal metal. In etching flaky steel for macroscopic examination, it was noted that the flake areas were attacked more readily than the normal steel and if the sample were permitted to remain long in the acid the flake area was eaten and resembled a minute crack. Also, when a carefully polished surface of flaky steel was etched with any of the copper-bearing etch mediums, the results invariably indicated that the flake areas differed in composition or condition from the rest of the metal.

Effect of Flakes

The physical properties determined upon the bars coming to the writer's attention are elastic limit, tensile strength, elongation, and reduction in area. In applying the load on a tensile machine, an interesting phenomenon was observed. Throughout the bar small cracks developed at right angles to the direction of stress; these cracks are without doubt flake areas. It is perhaps this phenomenon that has led some investigators to conclude that flakes are incipient cracks.

The most deleterious effect of flakes, as found in these bars, is the loss of ductility and corresponding decrease in reduction of area; the tensile strength and elastic limit are reduced but not so marked as these other properties. This is best shown by reference to bars 36, 38, and 032 in the table, which gave an elongation of 3.6, 6.8, and 0.0 per cent and a reduction in area of 2.0, 4.5 and 0.0 per cent. The corresponding tensile strengths are 62,900, 108,100 and 47,000 lb. (28,531, 49,033 and 21,318 kg.), respectively. The decrease in physical properties may or may not be dependent on the size of flakes. Generally speaking, the smaller the flakes the better is the steel, but this is not always true, nor can it be said that these properties and the size of flakes are always definitely related.

Suggested Causes of Flakes

The following suggestions have come to the attention of the writers as possible causes of flakes:

Foreign inclusions. Microexamination of a number of defective bars has failed to tie up in a conclusive manner for-

Table of Chemical and Physical Properties of Bars of Nickel Steel

		Chemical Analyses						Physical Properties			
No	Type of Fracture	C, Per Cent	Mn, Per Cent	Si, Per Cent	S, Per Cent	P, Per Cent	Ni, Per Cent	Elastic Limit, Lb per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, Per Cent	Reduction in Area, Per Cent
16	Cup	0.39	0.66	0.25	0.025	0.020	2.90	73,900	97,200	29.5	64.7
7	Star	0.41	0.79	0.29	0.011	0.020	2.87	78,700	108,600	24.5	63.5
8	Woody	0.42	0.60	0.122	0.019	0.019	3.14	72,800	87,000	5.5	17.7
18	Woody	0.41	0.66	0.25	0.015	0.020	2.98	66,700	115,900	19.5	39.5
20	Woody	0.40	0.55	0.15	0.021	0.025	2.85	62,900	97,300	7.0	7.8
36	Flake	0.44	0.66	0.34	0.021	0.020	3.29	61,900	62,900	2.0	3.6
38	Flake	0.37	0.59	0.19	0.019	0.020	3.09	73,400	108,100	4.5	6.8
032	Flake	0.38	0.69	0.24	0.033	0.043	3.24	47,000	47,000	0.0	0.0
39	Slag	0.41	0.66	0.23	0.040	0.036	3.27	77,000	106,600	9.0	11.8

eign inclusions with flaking. In fact, many such bars have been found that show the steel to be exceptionally clean in this respect.

Gaseous inclusions and cavities. Little investigation has been done along this line, but here again there has been little microscopic evidence to lead to any extensive research in this direction.

Scale and consequent local decarburization. It has been suggested that in rapid pouring the oxide film that forms on top of the metal may be churned in and entrapped in the metal on freezing. One would expect in this event to find oxide inclusions, but the writers have not found this to be so in even a majority of cases, and while in some cases oxides have been found they have not appeared in sufficient quantity to set this down as a primary cause of flaking.

Segregation of non-ferrous elements. The writers' experience in this matter is covered in the part of this paper dealing with the chemical composition of flakes.

Overheating and non-uniformity of heat of ingot prepara-

tory to forging. This seems to the writers to be on fairly firm ground and is discussed at greater length in the paper.

Shape of ingot and method of forging. In many cases square ingots forged on a flat die have been used. A change to octagon-shaped molds and forging in a V-shaped die decreased rejections to some extent; but as far as the writers' information goes, this change has not resulted in completely doing away with flaking.

Differential expansion of areas in heterogeneous metal. The suggestion is made that, where there are areas with varying coefficients of expansion, due to the more rapid expansion and contraction of certain parts in heating and cooling, lines of weakness or even ruptures may be set up in the mass which upon being stressed break readily with low ductility.

In this connection it may be said that anything which leads toward the production of a coarse fiber is undesirable. A basic steel, generally speaking, will fiber more readily than an acid steel and for this reason basic steel is desirable for armor where a fibrous back is essential. In the manufacture of nickel-steel gun forgings, where a coarse fiber is not desirable, acid steel has been most successfully used.

[The remainder of the authors' paper contains a detailed argument offering the presence of a heterogeneous austenite as a possible explanation of flakes and also deals with the effect of certain temperatures on the structure of the steel and the elimination of flakes.]

Future of Truck Manufacture

A warning against the overproduction of motor trucks in this country is issued by the Locomobile Co. of America, Bridgeport, Conn., in an article entitled: "Increased Truck Production Due to the War, Its Effects upon the Future." The word of caution is based upon congested traffic conditions, it being claimed that 65 per cent of the trucks are operated within city limits, and upon our present roads which do not stand up under heavy trucking as was revealed last year during the war emergency.

According to the article, "We now have a potential manufacturing capacity of a half million trucks of various sizes, which is nearly as many as are now in service throughout the United States and which represents an accumulation of possibly 14 years. . . . In the past few years many of us have had our point of view distorted by the enormous figures which are the natural consequence of a great war. . . . We are now approaching a time when it will be necessary to have the industry stabilized as is the manufacture of any staple article. . . . It would be a fair comparison to state that truck manufacturing will soon be nearer like the manufacture of freight cars—a sane, steady business of normal profits when under proper management."

Americans are also warned not to expect too great an export business, as the leading foreign countries will make their own trucks. English manufacturers candidly state they expect to produce sufficient trucks, agricultural and other tractors, to meet all requirements of Great Britain, the Colonies, and the Eastern trade, including Central and Southern Africa. The most formidable French concern is the Renault factory with 28,000 on the payroll. In Italy the Fiat company had at one time 47,000 on the payroll and will still be a strong competitor. The probabilities are that the Central Powers will make sufficient trucks for their own needs. States the article: "There are more plans being made in Europe to-day to get the world's truck business than are being made in America. Impressions seem to prevail here that the foreign factories will be without equipment or be incompetent to meet keen competition after the war, or that they are so busy with war business and so lack engineers and manufacturing people that it will take several years for them to get on their feet." This is not so.

At the present time the truck manufacturing machine tool equipment in the allied European countries is approximately five times as great as in 1914, and the production in proportion. It is believed that about 30,000 commercial vehicles were made in Europe in 1914.

GRAPHITE DEPOSITS

War Stimulus Makes American Iron and Steel Industries Independent

The war stimulus has developed many interesting possibilities as to sources of graphite for the iron and other industries and the general adjustment will place the American graphite users in practical independence of the foreign supplies in case of war or trade complications or for some grades in any case. The deposits in Alabama, Pennsylvania, New Jersey, New York and Eastern Canada are all fortunately conveniently located for distribution to the principal graphite users, and the progress in the development of processes of treatment of the crude ore and the more or less indiscriminate exploration and development of graphite deposits will undoubtedly result in a selective survival of a considerable number of these operations.

An interesting new locality for graphite is in Rhode Island. Several operations have been undertaken in this section and some of them give promise of continued production. One of these is at Cranston, Mass., near the Rhode Island boundary. Another is on Connanicutt Island, opposite Newport and Narragansett Bay. These deposits are probably in the same geological horizon as the Whitney coal (graphitic) mines, of interesting memory to New England investors. These mines are at Portsmouth, about half way between the two graphite deposits referred to. A thick series of beds of carbonaceous shale, highly tilted toward the west, has furnished the original source of the localized graphite deposits, which are due to regional and local metamorphism. Intrusive dikes of gabbro and some silicious intrusions have been factors in producing the graphite deposits and in controlling their location and extent.

The American Oil Co., Boston, formed about three years ago, successor of several "coal" and "oil" companies, formed to operate on Naragansett Bay, after drilling two wells for oil, one to 1300 ft. and the other to 2000 ft. without obtaining any encouraging results, undertook the development of the graphite deposits on the property, which were disclosed by the drilling for oil and which were exposed on the beach. A shaft was sunk 90 ft. and an incline and levels were driven on the graphite bed. A mill for grinding and grading the purer graphite product was installed and several hundred tons shipped during last year. The product is an amorphous graphite, about 60 per cent carbon and suitable for crucibles and foundry use. The company is proposing to operate on a larger scale and to install a mill to treat the lower grade material of which the quantity is large.

Some Improvement in Youngstown

YOUNGSTOWN, OHIO, March 18.—Estimates of the number of men out of work in the valley vary from 7000 to 9000. Some improvement is shown in operating schedules in effect this week. The Republic Iron & Steel Co. is operating six mills of the Brown-Bonnell finishing works, which was entirely idle last week. The open-hearth works is running about 50 per cent of normal. Only three blast furnaces at Haselton are producing iron, the rest being banked.

Other plants are operating from 50 to 80 per cent. Sheet mill schedules still reflect inactivity in this branch of the industry. Plate mills continue to produce heavily. Pipe demand continues below normal, business being characterized as from "hand to mouth."

Brightest prospects are shown by the tin plate trade, which is showing signs of revival now that the wage scale for workers has been fixed for the March-April period.

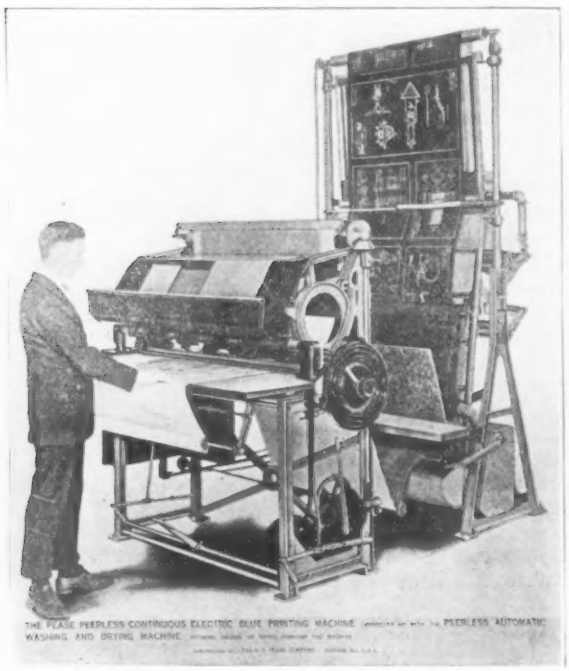
Mills are running this week about 80 per cent, the leading producer operating 16 of 19 units.

Sheet buyers are still awaiting price concessions, and the results of the Redfield plan to scale costs and prices. The Western Reserve works of the Brier Hill Steel Co. are idle. The DeForest Sheet & Tinplate Co. is operating alternate weeks.

BLUEPRINTING IN WAR WORK

Automatic Machines Developed by Chicago Company for Printing, Washing and Drying

In manufacturing and engineering, blueprints have come to be such a commonplace necessity that they are regarded as a matter of course. Few who handle them give much attention to the means of their production in large numbers. But, as with so many other things, the part played during the war by these indispensable aids to production brings them to the front for honorable mention.



Pease Continuous Electric Blue-Printing Machine

Machinery was paramount in war operations, and its production in the tremendous quantities required would have been impossible without the blueprint, and this in large numbers. The immense production of shells, guns, grenades, bombs, airplanes, tanks, ships and countless other things might not have been. In many cases, hundreds of sets of drawings, each set involving hundreds of individual prints, were required to set manufacturers at work at their part in the struggle.

In view of the importance of blueprints in war preparations, the experience of a Chicago manufacturer of blue-printing machines becomes interesting. The company to which reference is made is the C. F. Pease Co., which manufactures automatic blueprinting, washing and drying machines, blueprint paper sensitizing machines, accessories and supplies. From Platt M. Morgan, vice-president of the company, is obtained several facts of interest.

That other countries have found it necessary to meet the demand for a multiplicity of blueprints is evidenced by the fact that this company in the past four years has shipped machines to 20 foreign countries, including England, Holland, Spain, Russia, France, Australia, India, Italy, Japan and Canada, and even to far-off Java, all of which is an indication of export possibilities.

The Emergency Fleet Corporation, the American International Shipbuilding Corporation at Hog Island, the Aircraft Production Board, United States Corps of Engineers, Signal Corps and Quartermaster Department all make use of the machines. In connection with the designing of the Liberty motor, Lord Northcliffe visited the Bureau of Standards on an errand having to do with aircraft production and later his leading paper in London recorded that he had seen a "most remarkable machine for the duplication of drawings."

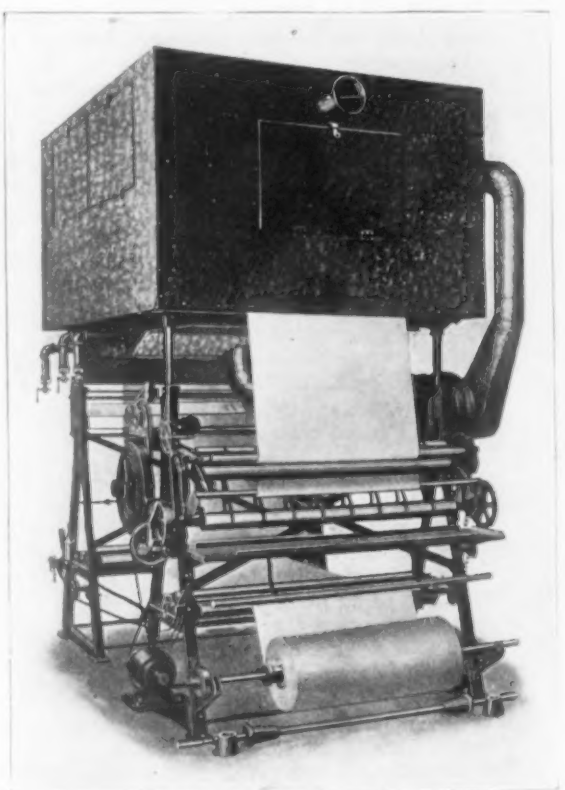
In one drafting room in Washington there are 19 machines in one row. Each of these machines has a capacity of 8000 sq. ft. of finished blueprints per day, although they have been used largely for the more difficult work of printing, washing and drying negative prints on both paper and cloth. For the number shipped to France for the Expeditionary Force, a man from the Pease plant went over to supervise operation.

One operator can print, wash and dry 100 linear yd. of blueprints per hour, during which time the machine consumes 7 kw.-hr. of electrical power, 60 gal. of water and 50 cu. ft. of gas. While rapid production follows the use of sensitized paper in rolls, prints can also be made on separate sheets if desired.

Course of Operations to Complete Print

One illustration shows the course of the paper through the apparatus. The tracings are fed into the machine from a table, beneath which are two horizontal spindles carrying rolls of sensitized paper of different widths. The tracings and paper are carried upward over a cylindrical segment of thick plate-glass by means of an endless canvas belt. The belt is driven by a small electric motor, the speed of which is controlled by a rheostat, so that the speed of the paper can be varied from 4 in. per min., which allows sufficient exposure for the slowest negatives and black-line prints, up to 6 ft. per min. The exposed paper can be examined immediately it has passed the glass segment, so that the speed can be adjusted to give the right exposure before any prints have been spoiled. In front of the glass is a bank of five arc-lamps, of the enclosed type, fitted with aluminum reflectors. Each lamp is separately wired and controlled by switches, so that the number of lamps employed can be varied according to the width of paper being used. A small electric fan, mounted on top of the switch-box, drives a current of air in a transverse direction through the machine in order to carry away the heat from the lamps.

After printing the exposed paper passes over a roller at the top of the printing machine, and thence to the washing and drying machine, where the paper is first washed by a spray of pure water and afterward treated by a weak solution of potassium bichromate, contained in a galvanized tank placed in the base of the



Machine for Sensitizing Blue-Print Paper. It has found favor with large consumers of ferro-prussiate paper, and in damp climates where sensitized papers rapidly deteriorate

machine. After a further washing with pure water, the paper passes upward in front of the drying device, over a roller at the top, and down at the back of the machine. The end of the paper, as it descends from the roller is formed into a loose roll, and this roll of finished prints continues to roll itself up automatically until the operator wishes to cut it off and start a new roll.

The blueprint paper sensitizing machine, to which allusion has been made, is also largely used by the Government in various departments. Shipbuilding companies have found it advantageous to sensitize their own paper, and the machines have found a large field in many foreign countries. Their use enables large consumers of paper to have a fresh supply at all times; the chemical being supplied to the consumers in dry

Battery of Five Continuous Electric Blue-Printing Machines, Which Also Wash and Dry, in the Drafting Room of the American International Shipbuilding Co., Hog Island

form and ready mixed. The sensitizing or coating machines are particularly advantageous in places far distant from the source of supply and in damp climates where sensitized papers deteriorate rapidly.

The sensitizing machines do not require a dark room, it being only necessary to protect the machine and the chemicals from the direct rays of the sun. They are operated by a 1/6 hp. motor and are practically automatic. A machine of standard size, which sensitizes paper and cloth up to 42 in., occupies a floor space of 3 x 5½ ft., and is 9 ft. 3 in. in height. Wider machines are made. They are constructed entirely of metal and are self-contained.

The drying oven, in the upper part of the machine, is heated with either gas or electricity.

Germany's Industrial Booty in Poland

In order to proceed efficiently toward the reconstruction of the ravaged country the Polish Government in Warsaw is forming a National Purchasing Association with a large capital for the purpose of placing orders for reconstruction needs.

The most vital aim of the Polish Government is to develop industry, agriculture and commerce, which were so badly hampered in pre-war times by the three powers which were dominating Poland. The war has ruined the country entirely; whatever the Russians left when giving up their part of Poland, the Germans took away during their three years occupation.

The following table taken from the very official reports of the German Central War Bureau shows what the requisitions of the Germans in Poland amounted to during the period beginning August, 1915, to the end of 1917, but exclusive of the year 1918, when all their sources were exhausted and when upon leaving the country they became more unscrupulous than ever: Metals, 18,140 tons; including 7000 tons of copper and 910 tons of steel cable; iron, 24,292 tons; leather belting, 754 tons; ropes, 511 tons; etc. Thus a new field is open for export from America and for investment of American capital, which will create a strong and economically independent Poland as an impenetrable wall against German expansion to the East.

Standard Samples of the Bureau of Standards

The Bureau of Standards reports that it is making strenuous efforts to renew its depleted stock of standard samples. The great increase in the demand for these from regular sources and extra calls from the inspection sections of the War and Navy departments, together with the inability to get increased appropriations for this work, have made it very difficult to keep the supply adequate. It may not be realized generally that the preparation of a sample consumes about three-fourths of the time required for the entire work upon it.

The present method of distribution has been cumbersome for some time. New ordering and shipping regulations have therefore been adopted and ordered published on two additional pages, 5 and 6, of the supplement to Circular No. 25, "Standard Samples—General Information." This new supplement will be ready for distribution about March 15, and can be obtained on request from the Bureau of Standards, Washington.

As adopted these regulations provide for the ordering of standard samples by number and name from the list printed on the first page of the above-mentioned supplement just as at present. From this time forward all samples for points in the United States or its possessions will be shipped by parcel post, c.o.d. Those for points in Canada, Mexico and other foreign countries will be shipped by express c.o.d. The regulations of the Department of Commerce require that the payments for these samples be in the hands of Government agents before delivery can be made. By using the parcel post exclusively the Bureau hopes to make it possible for customers to send in their orders and pay for them through their own post office when delivery is made. They hope in this way to make prompter shipments and avoid the necessity for refunds when samples ordered are out of stock. The 10 per cent quantity discount on four or more samples ordered at one time has been discontinued.

The Bureau has on hand at present a fairly adequate stock of the following:

Sample Number	Name	Constituents Determined or Intended Use	Weight of Sample in Grams	Fee per Sample with Certificate
2	Zinc ore D	Zinc	100	$1.00
4b	Iron B	C, Si, Ti, P, S, Mn	150	2.00
5c	Iron C	C, Si, Ti, P, S, Mn, Cu	150	2.00
7	Iron E	C, Si, Ti, P, S, Mn, Cu, Cr, Ni, V	150	2.00
8b	Steel, Bessemer, 0.1 C.	C, Si, P, S, Mn	150	2.00
9b	Steel, Bessemer, 0.2 C.	do	150	2.00
11b	Steel, B. O. H., 0.2 C.	do	150	2.00
12b	Steel, B. O. H., 0.4 C.	do	150	2.00
15a	Steel, B. O. H., 0.1 C.	do	150	2.00
16a	Steel, B. O. H., 1.0 C.	do	150	2.00
17	Sucrose	Calorimetric value and saccharimetric value	60	2.00
20a	Steel, A. O. H., 0.4 C.	C, Si, P, S, Mn, Cu, Cr, V, Ni	150	2.00
21a	Steel, A. O. H., 0.6 C.	do	150	2.00
22a	Steel, Bessemer, 0.6 C.	C, Si, P, S, Mn	150	2.00
26	Crescent iron ore	Al_2O_3, CaO, MgO	100	1.50
27a	Sibley iron ore	SiO_2, P, Fe	150	2.00
28	Norrie iron ore	Mn (low)	100	1.50
29	Magnetite iron ore (titaniferous)	Full analysis	150	2.00
33	Steel, nickel	C, Si, P, S, Mn, Ni, (Co, Cr, Cu, W, Mo)	150	2.50
34	Steel, A. O. H., 0.8 C.	C, Si, P, S, Mn (Cu, Cr, Mo)	150	2.00
35	Steel, A. O. H., 1.0 C.	C, Si, P, S, Mn (Cu, Cr)	150	2.00
38	Naphthalene	Calorimetric value	50	2.00
42	Tin	Melting point	350	2.00
43	Zinc	do	350	2.00
44	Aluminum	do	200	2.00

There are at present in course of preparation samples No. 6c Iron D, 13b B. O. H. Steel 0.6 per cent carbon, 14b B. O. H. Steel 0.8 per cent carbon, 23a Bessemer Steel 0.8 per cent carbon, 25a Manganese ore, 30a Chrome-Vanadium Steel, 31a Chrome-Tungsten Steel, 32a Chrome-Nickel Steel, and 37a Sheet Brass. Of these it is hoped to have Nos. 30a and 37a ready for distribution by April 1, 1919. Nos. 6c and 25a should be ready by June 1 and the others will follow as rapidly as facilities will permit.

DRY GAS CLEANER

Installation at Ohio Works of the Carnegie Steel Co., Youngstown

Some information about the dry gas cleaner which was installed at the No. 1 blast furnace of the Ohio works of the Carnegie Steel Co., Youngstown, Ohio, has been obtained from J. C. Barrett, superintendent blast furnaces Carnegie Steel Co., Youngstown district. F. E. Kling, chief mechanical engineer, and Luther B. Weidlein, experimental engineer Ohio Works, started experiments five years ago to overcome difficulties of cleaning and burning blast furnace gas. They developed a very efficient gas burner for boilers, which is truly an aspirating burner. Steps were then taken to make a comparison of results obtained from burning gas which had been cleaned or partly cleaned by various means and dirty gas taken directly from the dust catcher.

The first experiment was carried out with gas that had passed through an impinging type of wet washer. This reduced the temperature about 50 per cent, was not more than 50 per cent efficient in removing the dust, and the gas picked up about 15 per cent additional moisture.

The next experiment was made with gas that had passed through the cleaning plant for gas engines, which includes a spray tower, baffle tower and Theisen washer. Even if the gas was desirable for boilers or hot blast stoves, this method of cleaning is held to be prohibitive from the standpoint of cost. The point is also made that the sensible heat of the gas is reduced to such a point that the usual size combustion chamber is not long enough to obtain complete combustion. The gases, therefore, enter the boiler proper partly unburned and, coming in contact with the heating surface of the boiler, which is at the temperature of the steam, give up heat, which reduces the temperature of the unburned gases below the ignition temperature, with the consequent incomplete combustion and loss that might otherwise be prevented. The moisture content of the gas was reduced to about 30 per cent of the original with this method of washing. To accomplish this, however, it was necessary to reduce the temperature of the gas to the temperature of the water used for cleaning.

An experiment was then made with hot gas taken directly from the dust catcher, and much better results and efficiencies were obtained than with either of the former experiments, although large quantities of dust had to be contended with, and the dust had to be blown off the boiler tubes frequently.

A novel means of removing the dust from the gas was then developed, and an experimental cleaner was built, designed to handle 6000 cu. ft. gas per minute at 62 deg. Fahr. This plant was in operation, off and on, for about six months, being taken off and changed as various improvements were developed.

The gas passing through this experimental cleaner was consumed under a 400-hp. Stirling boiler, and after a month's operation, without blowing the tubes, there was less than 50 deg. Fahr. increase in temperature of waste gases on account of the dust accumulation. What little dust came through the cleaner was of such nature that a large portion of it was carried through the boiler and out with the waste gases. However, the portion deposited on the tubes was easily removed by blowing it with a hand steam lance.

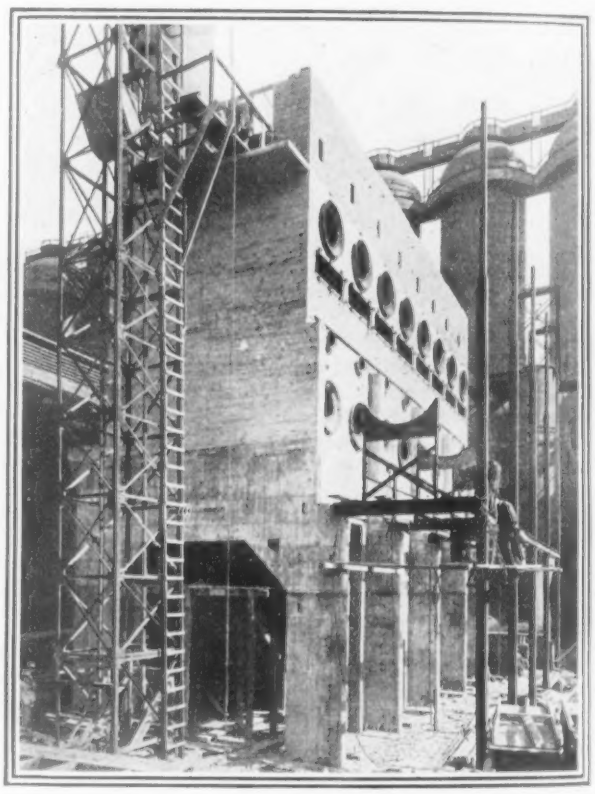
The dust carried by gas which had been wet washed baked on the tubes and was hard to remove. During a slip of the furnace, the dry cleaned gas would burn as usual, while the flame would extinguish in an adjoining boiler using wet washed gas, due to excessive dust. It was shown that it would not be necessary to blow the tubes oftener than once in two to three weeks to maintain almost uniform boiler efficiency.

Due to the satisfactory results obtained from the experiment, the United States Steel Corporation authorized the installation of a cleaner large enough to clean all of the gas from one blast furnace. This cleaner was installed at the No. 1 blast furnace of the Ohio works, and was built and ready for operation without interfering with the operation of the furnace, the latter being banked only long enough to make a connection to the existing dust catcher. This furnace has a capacity of 550 tons of iron per day, and produces 80,000,000 cu. ft. of gas, which passes through the cleaner daily.

The cleaner proper was constructed of reinforced slag concrete due to the scarcity of steel plates during the war. The accompanying photograph shows the cleaner in course of construction. The idea of using concrete for this purpose is quite novel in itself. This structure was built to withstand an explosion pressure of 15 lb. per sq. in., and it is well equipped with explosion valves of special design, which are set to open at 1 lb. pressure per sq. in. The walls, being 15 in. thick, act as a very good insulator to retain the temperature of the gas. The concrete has shown no deterioration, and has withstood all conditions to which it will be subjected, and no trouble is anticipated.

With inquiries favoring steel plate in preference to concrete, the inventors have designed an adaptable construction which, Mr. Barrett says, should appeal to the most skeptical.

A course of Sil-o-cel insulating brick was used in addition to the regular lining of firebrick in the gas



The Kling-Weidlein Dry Gas Cleaner in Process of Construction

piping, as the idea of retaining the sensible heat in the gases was foremost in the minds of inventors.

The operation of the cleaner is entirely automatic and does not require constant attendance. One of the men from the regular force maintained in blast furnace operation inspects and lubricates the machinery once or twice a day. Mr. Barrett adds that when put in operation about two months ago, without any preliminary trials, the cleaner worked satisfactorily, which is remarkable when considered that it is the first large installation of its kind. It has been in continuous operation since that time.

The power required to operate the cleaner 25 per cent of the time is 4.25 hp., and 75 per cent of the time 2 hp., making an average power requirement of 2.56 hp. as compared with 80 hp. to 100 hp. for the wet washer.

The dust is accumulated in hoppers of sufficient capacity to hold two or three days' accumulation. It is then dumped into standard hopper cars, the operation requiring only about one-half hour to remove the dust from the cleaner. Since the cleaner has been in opera-

tion, an additional 25 per cent of dust in the gas leaving the dust catcher has been reclaimed. Heretofore this was carried away in the water that was used for washing the gas, although it was supposed that very complete settling of the dust was being obtained in large settling basins. The average amount of dust deposited in this cleaner since starting operations is 63,500 lb. per 24 hr., although the gas has previously passed through a dust catcher 30 ft. in diameter. This represents 48.6 per cent of the total dust leaving the furnace by way of the downcomers.

The cleaner is maintaining a cleaning efficiency of 90 per cent, the dust content in clean gas being 0.10 to 0.30 grain per cu. ft. at 62 deg. Fahr.

The range of temperatures of the gases which have passed through this cleaner is 150 to 800 deg. Fahr., and the average loss in temperature due to radiation is 25 to 35 deg. with atmospheric temperature ranging down to 10 deg. There have been instances where the temperature of the outgoing gas has been 150 deg. higher than the incoming gas. This is due to a condition where the incoming gas was very low in temperature, the massive concrete walls having stored up the heat from gas of high temperature which previously passed through the cleaner, and giving it up to the gases of low temperature, the structure acting as a heat equalizer.

The resistance to flow or back pressure on the furnace is only 2 to 3 in. water gage. This includes all piping to and from the cleaner, and the cleaner itself. This, Mr. Barrett emphasizes, is considerably lower than the resistance through any type of wet washer. The cleaner is connected to a blast furnace that has been in operation for four years on the present lining, and it has been subjected to all of the conditions which are characteristic of an old furnace.

The cost of an installation for cleaning gas by this method compares very favorably, Mr. Barrett finds, with the cost of a complete wet washing outfit; and considerably less ground space is required, due to the absence of settling basins. During the comparatively short time that this method has been demonstrated, several additional installations are being contemplated, including another cleaner to be built at the Ohio works.

Adopting the method of dry cleaning gas permits other changes in practice that appear on the whole to be very advantageous. By having hot gases enter the hot blast stoves, it is possible to obtain higher flame temperature in the stoves, which will result in a saving of coke, since a higher hot blast temperature will be available. It will be possible to operate the furnace with fewer stoves by equipping the stoves with smaller checkers, thereby obtaining better operating efficiency. An installation for cleaning all of the gas from a furnace would cost, it is stated, about the same as a hot blast stove.

A summary of the advantages claimed for the dry cleaning over wet washing of furnace gases is as follows:

Sensible heat of the gas is retained.
When burned under boilers, the gas generates more steam.
When burned in hot blast stoves, produces higher blast temperature.
No water is required for cleaning the gas.
No settling basins are required.
Less ground space required, due to absence of settling basins.
No pollution of streams.
Less labor cost in handling the dust.
Less than one-tenth the power required to operate.
Less back pressure on the furnace.
Cleaning efficiency as good as the best types of wet washers.
No sludge dripping from gas mains and burners.

At the shops of the Pratt & Whitney Co., Hartford, there is increased demand for gages, this department showing actual enlargement. Among the more notable new products now under way there is a line of reference test blocks of hardened chrome steel finished to an accuracy of one one-hundredth-thousandth of an inch. These will be made in sets varying by tenths, sixteenths and eighths of an inch for use singly or as assembled units, properly certified by the U. S. Bureau of Standards as to correctness of dimensions and sold within reach of the average toolmaker's personal pocketbook.

To Foster Trade With Poland

Representatives of technical and commercial interests in the United States of Polish blood have organized the Society of Polish Engineers and Businessmen in America, to work in conjunction with the Commercial and Industrial Bureau of the Polish National Department, of 33 West Forty-second Street, New York, in developing closer relations between the new republic of Poland and the United States. The organization is headed by Ralph Modjeski, civil and consulting engineer, as honorary president. Steven de Csesznak, publisher of *Export American Industries*, is president. The society's headquarters are in the Engineering Societies Building, 29 West Thirty-ninth Street, New York. Its functions are to associate Poles in America for the purpose of co-operating and collaborating in the technical and commercial fields, and to develop a preparatory work toward bringing about closer economical relations between the United States and Poland. The society will act as advisers to the purchasers where desired. It will furnish them technical experts and will undertake for them all the necessary business detail with which, as foreigners, the buyers from Poland are less familiar.

Japanese Steel Consumption and Production

Figures prepared by the Yokohama chamber of commerce show a large increase in both the production and the consumption of steel in Japan during the war, according to the engineering supplement of the London *Times*. In 1913 the production was 254,000 metric tons and the imports 543,000 tons, while the domestic consumption was 765,000 tons, 33,000 tons being exported. In 1917, when the production rose to 529,000 tons and the imports to 675,000 tons, the consumption was 1,182,000 tons, 22,000 tons being exported. The imports in 1915 fell to 243,000 tons (the lowest figure recorded since 1904), owing to the diminution of supplies from Europe; but in the following years they increased greatly, owing to imports from America.

Spain's Blast and Steel Furnaces

The number of blast and steel furnaces in Spain in 1917, according to official data published in the London *Iron and Coal Trades Review*, is: Blast furnaces, 29; puddling furnaces, 40; reheating, 70; open-hearth, 28; converters, 2; cupolas, 20; forge furnaces, 22, and electric furnaces, 2.

Iron ore has been discovered in the island of Celebes, in the Dutch East Indies, between Malili and Lake Toewoeti, according to the London *Iron and Coal Trades Review*. Iron ore had previously been found only in four fields of which one, near La Rona, on Lake Toewoeti, had been explored seriously. The ore in the newly discovered field is roughly estimated to contain 50 per cent iron, and it has been calculated that the field contains 10,000,000 tons of ore. Samples sent to Batavia from East Celebes were tested and found to contain at most 0.06 per cent phosphorus.

The Exports Control Committee of the United States Railroad Administration has announced the cancellation of the embargo restrictions calling for a permit system on iron and steel articles destined to South America, Central America, Mexico, Cuba and the West Indies so that the only movement subject to permit control will be on iron and steel articles moving overseas.

A bill will shortly be presented in the Belgian parliament for the purpose of establishing a national credit institution in order to reinstate Belgian industry. The national bank is reported to have decided to allot £1,000,000 for the new institution which will have a total capital of £16,000,000.

French advices say that the Deutsch-Luxemburgische Co. has disposed of its mines and works at Differdange to a Danish house acting for an American syndicate.

ESTABLISHED 1855

THE IRON AGE

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Published Every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

W. H. Taylor, *President and Treasurer* Fritz J. Frank, *Vice-President* George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Chas. G. Phillips, *Vice-Pres.* W. H. Taylor, *Treas.* A. C. Pearson, *Secy.*

BRANCH OFFICES—Chicago: Otis Bldg. Pittsburgh: Park Bldg. Boston: Equitable Bldg. Philadelphia: Real Estate Trust Bldg. Cleveland: Guardian Bldg. Cincinnati: Mercantile Library Bldg. San Francisco: 320 Market Street.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $5.00; Canada, $7.50; Foreign, $10.00 per year. Single copy, 20 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Predatory or Helpful Labor?

An extremely important economic question is being decided, whether labor is to be predatory or helpful, whether it is to prey upon such earnings as employers may be able to make, or is to co-operate with employers so that the earnings will be larger. The question itself is not a new one. The newness is that it has come up for a more important adjustment than has ever been thought of in the past.

Predatory wealth is no new term. The term predatory labor is not so familiar, but it is precisely as apt. Labor has always been more or less predatory. The indisposition to apply the term arises from its apparent harshness rather than from any real appearance of unfitness. Labor preys upon capital when it multiplies jobs and increases the capital investment necessary to turn out a certain quantity of product. When a manufacturer accepts a large contract for the delivery of goods he makes and his men thereupon strike for terms they do not deserve, the men are preying upon their employer. If labor is to be predatory, if it is selfishly to seek all it can muster power to obtain without regard to the national economic principles involved, or without regard to anything but its own interest, no definite limit can be predicted for the process. If certain methods bring about an eight-hour maximum day, the same methods may later bring about a seven-hour day, then a six-hour day. Why work more than an hour a day?

A shock was furnished by the failure of the balance of power principle to keep the peace of Europe. Never regarded as better than a makeshift, wise counsels have now thrown the principle into the discard. What but an attempt at balance of power have been the relations between employers and employed in the past? By various circumstances, largely fortuitous, rather than by any justice or right in the principle, a semblance of balance has been maintained. When employees bid fair to become too powerful the employer increases his vigilance and redoubles his effort to retain management. Again, there have been cases in which the employees succeeded and the business was wrecked, the result being that there was one employer less and a number of men seeking new jobs.

It is now recognized that labor is not a mere thing to be bought and sold on a competitive basis. Labor should be co-operative and helpful, not held by a balance of power by being given more money or shorter hours when it becomes strong and being forced to yield concessions when it becomes weak. The question that is now deciding itself is whether labor shall be accorded, and accept, this position or shall multiply many fold its previous predatory practices.

For co-operation to occur the basis must be furnished. There must be means of communication. There has been too much talk of educating labor. Possibly the employer has less occasion to educate labor than he has assumed. Perhaps labor knows enough to co-operate if the basis for co-operation is created.

Readjustments in Prices

In any attempt to forecast commodity prices over a period of years it is essential to dissociate the after-war deflation from the periodic fluctuations that are normal to commodity markets. The deflation that must follow war-time inflation is too big a thing to be taken care of by a single one of the cyclical swings to which markets are subject. To put it in the concrete, in the iron and steel industry between 1898 and 1914 there were five sharply marked price movements, culminating approximately in the following years respectively: 1899, 1902, 1907, 1909 and 1912. To measure from trough to trough, one may take from 1897 or 1898 to 1914, 16 or 17 years, making the average length of the pendulum's round trip three and one-fifth or three and two-fifths years. Measuring from peak to peak, from the end of 1899 to the end of 1912, there were four dips in 13 years, or an average period of three and a quarter years.

So radical and extensive has been the inflation in everything that it is out of the question to expect the entire deflation to occur in a fraction, say one-half, of a whole period of but slightly more than three years. Nor can anyone find good ground for asserting that when the movement has usually covered a period of but little more than three years, there will be in this case a period of much greater duration. Apparently there is something in men's minds or in the nature of business tending to produce this rhythmic movement and determine in some rough way its duration.

It is obvious that when war conditions have so greatly inflated all prices a fresh rise cannot occur

when the war-time influence ceases. It should also be accepted that whatever decline in prices does occur at this time must not be regarded as writing off all the inflation that the war caused. The decline that is now occurring will be followed by an upturn and that in turn by another decline. The pendulum will probably make several round trips, of greater or less amplitude, before the last of the war-time inflation has been eliminated. It is far from improbable that each successive dip in the market will be to a lower level than the preceding. As regards iron and steel products, fundamental conditions have so changed that it is altogether unlikely that the historic low prices of the past will ever be touched again. If, as seems quite probable, the next few dips are to be to successively lower prices, it would follow that the first dip will not be a very extensive one.

The historic low prices for iron and steel were made in 1897 and 1898. Some commodities reached their lowest points in the summer of 1897, others in the summer of 1898. Taking the average of all the low prices at 100, the low point of 1914 was in the neighborhood of 125, high points ranging from 150 to 250 having been reached in various intermediate years. The war-time level was in the neighborhood of 300. To carry the sketch farther, but by no means to attempt a scale drawing, we may have within a year a dip to 225, then a rise to 250 or 275, then a dip to 200, then a rise to 225 or 250, then a dip to 175, with a rise to 200 or 250. That might be the lowest dip of all. The next might be to 150 or it might be only to 200. It may easily be ten years before the last vestiges of war inflation will be erased from the market.

Every 20 years or so the country has had a prolonged industrial depression. Such unfortunate penalties of extravagance or indulgence in optimism cannot be entirely avoided. If another serious industrial depression of several years' duration does come, it will be in that period that the last of the war-time inflation will disappear. Meanwhile we may look for several swings of the industrial pendulum.

Defects in Gun Steel

In discussing the defects in nickel gun steel at the February meeting of the Mining and Metallurgical Engineers, Dr. Henry M. Howe suggested that possibly American metallurgists and ordnance makers had been too ready to accept nickel steel as the only proper steel for heavy guns. He felt that perhaps carbon steel, under certain conditions of production and treatment, might have met all requirements. It is certain that, had the latter been more extensively used in the great rush to produce gun steel in quantity, the serious hindrance to the war ordnance program caused by the discovery of the flakes in the nickel steel, as described on other pages of this issue, would have been avoided. Expert testimony is that no such defects have been found in carbon steel. It is certainly easier to produce and treat, and less expensive than the "tender" or alloy steels containing nickel or nickel and chromium.

An interesting and presumably unexpected phase of the flake problem is that these defects were found in plentiful numbers in nickel steel made in the electric furnace. The specimens dealt with by Messrs. Clayton, Foley and Laney, as mentioned in one of the discussions printed elsewhere, were from such electric steel. This is not to imply that the process was at fault; rather it might be supposed that a proper manipulation of the process would prevent such defects. In this connection is the statement from one large American plant making nickel gun steel by the acid open-hearth process that no such defects were found in its steel.

It has been observed that basic steel has more of a tendency to assume a fibrous structure than acid steel and hence it has been used in making armor plate, in which such a condition of the steel is desired, particularly in certain portions of it. If this is so and if flakes are fibrous in nature or bordering on this, the question comes up whether the basic nature of the electric process or the final refining on a basic bottom was a cause of these flaky or woody fractures in nickel electric steel.

It is recalled that over twenty years ago certain American steel foundrymen were called upon to make large nickel steel castings of acid open-hearth steel. Some of these castings met the specifications while others did not and were the cause of much controversy. A satisfactory explanation of the defects in the test bars and elsewhere was not forthcoming at that time. The microscope and etching mediums were not then available in their present application to steel problems. In the light of the present knowledge of this subject it is probable the defects in those castings were none other than flakes, for they were quite similar to those in the gun steel of to-day.

As far as the study has gone it appears that these peculiar defects are inherent in the steel from the beginning. Whether they are due to the presence of nickel or to the process of melting, refinement or heat treatment is undetermined. Despite the fact that quantity production of gun steel has stopped, it is probable the National Research Council will continue its labors and solve the problem. Of peculiar interest is the possible bearing of this work on the solution of the transverse fissure problem in rails.

Worcester's War Exhibition

Worcester, Mass., has established a unique and highly educational exhibition of the war products of its shops and factories. It is an astonishing collection, viewed not only for its variety and the revelation of many things which were kept a secret while the war was in progress, but also in its suggestions of methods of manufacture and of adaptation of standard products to new purposes.

The exhibition had its inception in a bit of enterprise on the part of the Worcester Club, the most prominent of the social clubs of the city. It was created under the direction of Aldus C. Higgins of the Norton Co., and was first shown in the club house. There it was confined to the products of the plants of the members of the club, but as most of the important industrial works of the city are represented in the member-

ship, the collection was truly representative of Worcester. Now the local Chamber of Commerce has taken steps to make the exhibition a permanent one, and will increase its scope to the extent of adding those war products of the city which were not included in the beginning. It will be held for some time in the hall of the Chamber of Commerce, and afterward will be given into the care of some institution, perhaps the Worcester Polytechnic Institute, that it may be a permanent reminder of industry in war.

A chief factor in the part played by American industry during the war was the placing of everything on a manufacturing basis. Production had to be in enormous quantities and on the interchangeable plan. The stimulus of patriotism worked to accelerate design and production to highest speed; in fact, a speed never before attained. Obstacles which in ordinary times would have caused effort to drag were brushed aside and promptly forgotten. Competitors exchanged ideas freely, through direct intercourse or through Government channels, and the result of this coordination was passed on to newcomers in the field, that they, too, might produce at topmost efficiency. Where materials were lacking because dependence had been placed hitherto on sources which war had shut off, ways were found to produce those materials at home.

The Worcester exhibition is the embodiment of the industrial teamwork which was created in the endeavor to labor for the common good. The collection is interesting in the martial nature of the products shown: with its rifles and cannon and gun carriages, projectiles and bombs, gas masks and hand grenades or the parts of these things; cables that held the mines of the North Sea, and controlled the observation balloons of the battle fronts and at the same time kept them in telephonic communication with the ground; the multitudinous uses to which wire was put. All these things and others, each carefully tagged with its purposes and specifications, combine to hold the attention of the visitor. But the greatest immediate value of the collection lies in the display of advancement in the manufacturing science which the stress of war brought forth.

In a few cases, actual discoveries resulted. A notable instance is the method employed in drawing cold metal into a shell booster, which is the part that contains the bursting charge, where the metal is fashioned from a flat disk of steel into an elongated cup and turned back upon itself and given walls of tapering thickness, thus supplying the imperative necessity, a one-piece, absolutely unleakable booster, without which gas shells could not be safely used. The accomplishment of these various operations in combination constitutes a new art in pressed metal, the experts agree. Other usual feats of pressing and stamping metal are shown, and also of screw machine production and of the drop forge shops, and the uses of wire as set forth are of extraordinary interest. The machine tools of Worcester, adapted for their special purposes in munition making, are shown in photographs and their products in actuality.

It will be noted that this exhibition is worth traveling many miles to see, which brings up the suggestion that should other cities and towns establish similar collections, a really great educational force would be created. Many American communities have wonderfully diversified industries, and each has products in which it excels. From collections such as that in Worcester most important lessons are to be learned. In modern shop management, the education of employees along the line of the goods manufactured is held to be a most important factor, and perhaps no better series of lessons could be learned than those of a series of collections of products, intimately revealed.

The Soldier's Return to Industry

There are conflicting statements concerning labor supply and demand. The Governor of Florida said at the conference called by President Wilson at Washington three weeks ago that Florida had need of 2,000,000 workers. That did not mean that this number of returning soldiers or even a very small percentage of it could be given employment in Florida to-day. It was only a way of saying that if all the plans for drainage and other improvements in Florida were carried out it would require an army of 2,000,000 men—a figure probably much exaggerated in whatever way taken. Such statements are but little worth while in the handling of the present problem of putting returning soldiers into the right places or of getting new employment for many thousands of workers who were thrown out by the canceling of war contracts.

For a long time there has been a scarcity of workmen of the strong arm and strong back description. In the early weeks following the armistice it was common to hold up this labor scarcity and then to observe that plenty of work would be available for the soldiers when they returned. The fact is that immigrants, of whom there have been few for four years, usually absorb the fetch-and-carry jobs and that this kind of work was done by a very small number of the soldiers before they went to war, so that they will not count in any appreciable way in the common labor situation.

Another factor to which attention is being more and more called is that the returning soldiers in many cases are unwilling to take the positions they left. They want better jobs than they had when they went away. This is entirely natural, and no fault is to be found with such a desire, but it need not be said that it complicates immensely the problems of the employment boards. Higher pay than he earned when he went to war the soldier will find without much difficulty, for wage increases have been general in the past year, but a new and better class of work, or in other words, advancement in position, is not easily supplied to hundreds of thousands of men.

Whether the soldier went to France or whether he remained in camp at home, his desire for agreeable work and high pay on returning to industry is the same. Recently the effort was made to recruit workmen for Atlantic coast shipyards from the men who were about to be sent home from camps. Blanks were scattered widely and the locations of the yards were given, together with the different kinds of work for which recruits were wanted. It was expected that a good many soldiers in the camps would be attracted by these offers.

However, the net results in applications were very meager, almost negligible.

Another thing noticed by all who have had to do with fitting returning soldiers into industry is that very many are not eager to go to work. This, like the desire for a better than the pre-war place, is natural; but it must be regarded as an offset to some of the animadversions on employers based on the large body of unemployed ex-soldiers. The same thing was noticed in Great Britain, even in the case of miners requisitioned in war time and sent home from the front to help save the critical situation as to coal supply. It is not surprising that the returning soldier, now that the life-and-death emergencies of the war are all past, should take time for the radical readjustments involved; but let full recognition of that state of mind be given by those who are vehemently charging that men from the army are not being admitted to industry with proper speed.

The human factors in the problem of re-employment for soldiers are neither few nor small and the failure to recognize them may be responsible for a very faulty diagnosis of the present exceedingly difficult situation in industry.

Bonus Case of Central Steel Co. Settled

Last week, at Massillon, Ohio, a settlement was made out of court by representatives of both sides in the suit brought by Dr. William B. Andrews of Kent, Ohio, a minority stockholder in the Massillon Rolling Mill Co., in which the plaintiff pleaded for the return of more than $1,000,000 in stock and cash, which was stated to have been distributed among directors and officials of the Central Steel Co. and the Massillon Rolling Mill Co. in the past year or more, as a bonus award for special services claimed to have been rendered the two companies. Some of the stockholders in the two concerns objected to the payment of these bonuses, and entered suit in court to recover the money, but a satisfactory settlement was reached before the case came to trial. The terms of the settlement include an agreement that the defendants shall pay $275,000 to the Central Steel Co. for the benefit of stockholders of that company in settlement of all issues.

The bonus plan and contracts with officers and employees mentioned in the pleadings were validated and approved, except that hereafter no common or preferred stock of the Central Steel Co. shall be paid as bonuses, excepting the balance of the 2500 shares of common stock set aside for bonus distribution by resolution of the stockholders on Oct. 31, 1914, the same being 105 shares which may be issued to employees of the company other than directors and officers.

Increase in Building

Private individuals and corporations are responsible for most of the building activity in that section of the country East of the Missouri River and North of the Ohio, according to a statement just issued by the Division of Public Works and Construction Development of the U. S. Department of Labor. The building figures in the statement are for the first three weeks in February and, while they show building activities far below the pre-war normal, they show, also, a marked increase in February over January of this year.

Contracts awarded during the first three weeks in February cover building and construction works to cost, approximately, $92,000,000. The total of the January contracts was but $50,731,000. February's increase over January, since the former figures are for three weeks only, will be more than $50,000,000, or almost double the January figures.

CONTENTS

The Practical Analysis of Molding Sand 739
Great Iron Ore Possibilities 742
Democracy Applied to Shop Management 743
Novel Mail Delivery System 745
Small Electric Trucks for Factories 746
Adjustable Anchorage for Motors 746
An 18-In. Worm Wheel Generator 746
Labor Situation:
View of Unemployment from Employers' Side — Decisions by the National War Labor Board 747-748
Blast Furnace Slag Concrete 750
Supply Convention Committees 750
Machine Tool Builders to Meet in May 750
Systematized Scheme for Gathering and Handling Turnings 751
Air Compressor for Tires 752
A Sine-Angle Measuring Plate 752
Hand Punch for Metal 752
German Machine Tools 752
Correct Lubrication of Air Compressors 753
New Open Die Double Stroke Rod Header 755
Army Gas Mask of Little Use in Industry 755
Freight Car Supply Improved 756
Earnings of Iron Companies in War Time:
Sloss-Sheffield Steel & Iron Co.—Republic Iron & Steel Co.—Railway Steel-Spring Co.—Bethlehem Steel Co., 757-758
Strange Defects in Nickel Gun Forgings 759
Future of Truck Manufacture Questioned 763
New American Graphite Deposits Adequate 763
Automatic Blueprinting Machines 764
Standard Samples of the Bureau of Standards 765
Dry Gas Cleaners at Ohio Works of Carnegie Steel Co. .. 766
Editorials:
Predatory or Helpful Labor?—Readjustments in Prices —Defects in Gun Steel—Worcester's War Exhibition—The Soldier's Return to Industry 768-770
Bonus Case of Central Steel Co. Settled 771
Increase in Building 771
New French Steel Selling Agency 771
Correspondence 772
Many Lake Superior Iron Mines Closed 773
Iron and Steel Markets 774
Pittsburgh and Nearby Districts 777
Nova Scotia Steel & Coal Co. Report for 1918 784
Iron and Industrial Stocks 785
Prices Finished Iron and Steel, f.o.b. Pittsburgh 786
Metal Markets 787
Personal 788
Obituary 789
Report of Republic Company Shows Advancing Steel Costs 790
Responsibility for Prices Put on Steel Committee 791
Finding Employment for Soldiers 792
Status of Work Done on Neville Island Plant 792
Machinery Markets and News of the Works 794
Current Metal Prices 804

New French Steel Selling Agency

A new French selling office, called the Comptoir Metallurgique Français, with headquarters at Paris, has been formed to undertake the sale of all the rolled products of the French rolling mill and steel plants, with the exception of certain products, such as beams and sheets, which are controlled by their own selling offices, and also to distribute the rolled products which the French Government is requisitioning from German works. According to *L'Usine*, of Paris, the selling prices are to be averaged between the material which is placed at the Comptoir's disposal by the government and the output of the French works, but the government has reserved the right of controlling the selling prices in both cases. In England it is thought possible that English rolled products may shortly be offered in France at lower prices than the Comptoir can quote, for the present conditions of production in the French works cannot be compared with those prevailing in Britain. The Comité des Forges has issued a circular fixing the following prices for Cleveland pig iron delivered in France during the first quarter of 1919: No. 1, 279 frs. ($48.95); No. 3, 277 frs. ($48.60), and No. 4, 275 frs. ($48.25) per ton.

CORRESPONDENCE

No Mystery in Russia Sheet Iron

To the Editor: I note an article in your paper written by Griffith Davies (THE IRON AGE, Feb. 6, p. 403), asking about the manufacture of Russia iron. He mentions that it was made in penitentiaries by convict labor, and that this labor was never permitted from out of those prisons, because the secret of manufacture would be given away.

This is all a myth. The manufacture of Russia sheet iron can be seen at the various mills in Russia, or could before the chaotic condition there, by anyone who could procure sufficient official influence to get a permit to go into those mills.

The development of the making of Russia iron in this country by the Wood family began with James Wood, the grandfather of W. Dewees Wood, who perfected its manufacture in this country. At the time of W. Dewees Wood's death the iron was manufactured very similarly to its method of manufacture in Russia, only it was done with improved methods, thereby enabling him to compete with the foreign article on price, where they had such very cheap labor.

The reason Russia iron is so much better than most other sheet irons is that it is made from charcoal bloom iron. The oxide upon the surface is deoxidized by charcoal being placed between the sheets and packs being heated, so as to bring them to a sufficient temperature to deoxidize the oxide. It is then pounded under hammers, which gives it its very fine gloss. The dapple came from using rolls cast in sand.

I hope the above contents may be of interest to you and your readers, and I hope will be an answer to Mr. Davies' inquiry.

THOMAS D. WOOD.

Alan Wood, Iron & Steel Co., Philadelphia.

A New Light Aggregate for Concrete Ships

To the Editor: The Emergency Fleet Corporation's activities are now being discussed with somewhat of a pronounced bias. The pessimist cannot see how the Pacific Coast can attempt to compete with the cost of ship construction in England and Japan. But the optimistic and naturally American attitude is to get around that handicap, if it really exists, by following original lines.

In this spirit the Emergency Fleet Corporation did not hesitate to afford the startlingly novel idea of reinforced concrete ships opportunities for a fair trial, although there was no lack of expert opinion to point out that while it might be all very well to provide imperatively needed tonnage during war time by the expedient of reducing time of construction through replacing the hull, built up of rivetted plates, by one simply poured of concrete, yet, with the return of normal times such vessels could not be operated economically, if for no other reason, because of the much larger deadweight compared to the available cargo space.

Now comes the news that the Emergency Fleet Corporation, after exhaustive trials, has authorized the employment, in the concrete mixture for four new vessels, of a substitute for the aggregate commonly used as rock and sand, and which is referred to as "light aggregate." The new substance, used both as rock and sand, is named after its inventor, Gus Larson, superintendent Los Angeles Pressed Brick Co., Los Angeles, Cal., with the trade name of "Larsite." By its use the weight of the poured concrete will, it is claimed, be reduced from 150 lb. per cu. ft. to 85 lb., and both strength and flexibility of concrete so prepared are said to be fully equal if not superior to that of the best ordinary concrete. Full particulars of tests are expected to be published authoritatively by the Emergency Fleet Corporation in a short time.

In appearance "Larsite" has little to distinguish it from ordinary black slag, and, although the method of its manufacture can not be disclosed while under review at the Patent Office, it is very evidently a product of over-oxydation of clay in the kiln. The raw material is an ordinary red clay that would otherwise go into paving or building brick, but in the course of manufacture it swells to three times its original bulk, and these large lumps, called presumably from habit more than from perception of similarity, "bricks," possess the property of not absorbing water, which, combined with specific gravity less than water, enables them to float on water, even after long periods of immersion. This quality of non-absorbtivity is, of course, a valuable adjunct to the concrete made with "Larsite," as also is its hardness, which is such that in a finely ground form it is successfully used as an abrasive. As an insulating material it is said also to have valuable properties. It will be interesting to watch the performances of the four 7500-ton oil tankers, two now building at San Diego and two at Oakland, in which "Larsite" is to undergo its final test under operating conditions.

E. S. T.

Los Angeles, Cal.

Coping Steel Beams

To the Editor: On page 694 of your issue of March 13 you have an article entitled, "A Quick Method of Coping Steel Beams," in which the author advises your readers that coping by the oxyacetylene reduces handling to a minimum. While everything that he has said in this letter is true, he has only partially told the story.

Oxyhydrogen cutting is cleaner, quicker and cheaper than oxyacetylene cutting and we would request you to inform your readers of this fact.

EUGENE SCHOEN,
General Manager International Oxygen Co.

Newark, N. J.

Indianapolis Metal Trades Meeting

Two features of the thirteenth annual meeting and dinner of the Indianapolis branch, National Metal Trades Association, March 31, will be addressed by Howard Coonley, vice-president United States Shipping Board, on "Meeting the Problems of the Emergency Fleet Corporation" and Dr. W. A. Pratt, Cedar Rapids, Ia., on "Germany's Economic Program Now Outlined for the Recovery of Her Lost Trade, and a Study of Industrial and Other Forces, Still Alive, With Which the World Will Have to Deal." The former will treat the shipping board's methods of handling industrial problems through the shipbuilding labor adjustment board and the education and training section, touching on post-war business and labor problems. Dr. Pratt, an international tourist and student of world economics, traveled extensively through the central empires before the war. The local chapter has 34 members, but several hundred manufacturers and business men are expected at the meeting.

Rhode Island Metal Trades Meeting

The twelfth annual meeting and dinner of the Rhode Island branch, National Metal Trades Association, was held at Providence, March 13. There were three main addresses by Joseph H. Gainer, mayor of Providence; John C. Spence, Norton Grinding Co., Worcester, Mass., on "Industrial Training During and After the War," and Dr. W. Warren Giles, East Orange, N. J., on "The Way Out." Officers were elected as follows: President, W. T. Murphy, Standard Machinery Co.; vice-president, H. B. Johnson, General Fire Extinguisher Co.; secretary, Thomas A. Barry; treasurer, Henry S. Chafee, Builders' Iron Foundry; executive committee, P. C. DeWolf, Brown & Sharpe Mfg. Co.; A. I. Harvey, Universal Winding Co.; J. E. Osgood, J. M. Carpenter Tap & Die Co.; W. S. Sisson, D. & W. Fuse Co. President Murphy presided and there was singing of patriotic and popular melodies.

MANY IRON MINES CLOSED

Cuyuna Range Suffers—Labor Conditions in the Lake Superior Region

Lake Superior iron miners are marking time against the date of an inauguration of the 1919 buying movement. So far there is no suggestion of a time nor a definite price for ore for the season. The uncertainty and delay are having their effect on most operations, though some continue at full speed ahead regardless of immediate conditions.

On the Mesaba and Cuyuna ranges not less than 40 mines are closed temporarily, and many others are running under check. The Cuyuna district is especially hard hit by present conditions and prospects because of the proportion of manganiferous mines there. Last year these mines produced nearly 700,000 tons of its total, and now very few of them can operate, and only those which are steam shovel properties or produce an ore of exceptional merit. In general, the Cuyuna has not realized the expectations of its friends, and operations there have not met the success that was expected by them. Comparatively few of the mining companies operating there have made money commensurate with their risk and outlay.

The labor situation in the Lake Superior iron region is not at all serious at this time; even though these mines have closed and there is a considerable volume of unemployed labor. This labor drifts about, and probably gets about as much employment as it desires, on the whole. A steadying influence is the chief employer, the Oliver Iron Mining Co., which is taking on many of those let go, on the Mesaba, by other operators. There is little talk of a spring strike, not very much I. W. W. or Bolshevik current, and an acceptance of the situation on the part of the men, both citizens and aliens. The latter are paying the alien tax readily, and many who might easily evade it by declaring an intention to reside in the United States are paying the tax in preference. This tax now amounts to 42c. a day for miners and 38c. for common labor. It is taken out of the pay checks by the companies, and there is no trouble over it. These aliens seem to have a much more definite feeling of respect for the United States Government than ever before.

There has been no change in wage scale, from war time schedules. Miners are getting $5.28 per day and surface labor $4.84. This is the highest scale ever paid in the iron region. An interesting comparison between this scale and that which prevailed in the ante-war period is as follows:

From	To	Per Cent Compared with Pre-War Average (36 Months)
Aug. 1, 1914	Jan. 31, 1916	103.41
Feb. 1, 1916	April 30, 1916	109.52
May 1, 1916	Dec. 15, 1916	118.83
Dec. 16, 1916	April 30, 1917	130.72
May 1, 1917	Sept. 30, 1917	144.06
Oct. 1, 1917	April 15, 1918	159.04
April 16, 1918	July 30, 1918	175.90
Aug. 1, 1918	Sept. 30, 1918	196.83
Oct. 1, 1918	This date	215.33

This is an increase of 115 per cent over the wages paid during the years 1911, 1912 and 1913.

Mechanical Methods

There is a decided drift on the part of operators toward mechanical mucking. Underground loading is the one branch of mining that has not advanced greatly in labor-saving devices. It is the one field where a mass of unskilled and disorderly and sometimes discontented labor finds lodgment. It requires less skill than other branches and therefore is paid lower wages, and it accounts for a large part of the difficulties of the past. If this labor can be reduced relatively to other lines, it will permit a comparatively better scale of wages, will reduce the number of unskilled aliens in mines, will lessen overhead and make employment more regular; and, on the other hand, it will permit a greater flexibility in mine operation, so that mines can respond more readily to changed conditions. For the Mesaba range in particular, and generally for the others, an underground loading device must be of a size to permit its free operation in a 7 x 7-ft. drift. This limits the types practicable. Many machines are on the market, most of them suitable for some situations, some of them perhaps for most places. But many operators do not seem to feel that the ideal mechanical mucker has arrived and they are looking for it.

Early Opening Expected

Ice conditions on the upper lakes are such as to warrant the expectation of a very early opening of navigation. There is no ice at all anywhere on Lake Superior and vessels are navigating the lake; Duluth harbor is in part open, and what ice there is about the piers and elevators will soon be gone. In the Sault River there was from 10 to 14 in. of ice remaining at the date of the last report, March 11. This is about 8 in. under normal. The Sault canals can be opened any time. The rivers and connecting channels east from the Sault River are now free. There is no pressure for an early opening on the part of ore shippers, but there are some 68,000,000 bu. of wheat in storage at Duluth and the Canadian ports of Port Arthur and Fort William, and this grain is wanted. Most of it is owned either by the U. S. Food Administration or by the allied European Governments, and it will go overseas as soon and as fast as possible. This will call for as early an opening of navigation as practicable, especially if the glut of grain at Buffalo and other ports is cleared away in time. Again, while the theoretical capacity for grain storage at these western primary points is some 75,000,000 bu., the volume of grain now in store is about all that can be taken, the elevators are chock a block, and receipts from the farms are practically nil. There is still much grain left on farms and in country storage from the crop of 1918, and a large share of this is in the hands of ultimate buyers. So navigation will probably open early in April.

American Electrochemical Society's April Meeting

The New York meeting of the American Electrochemical Society will be held April 3 to 5 in Rumford Hall, Chemists' Club. A feature will be a symposium on "Released Information," consisting of the presentation of data by members who have been engaged on important war work of a chemical or electrochemical nature and who are now permitted to write and talk about the processes they have been working on. Both Friday morning and afternoon sessions, April 4, willl be devoted to these topics.

First Vom Baur Electric Steel Furnace Operating

The first Vom Baur electric steel furnace has been put into operation at the plant of the Hercules Steel Casting Co., Milwaukee, Wis. In the last few weeks 35 heats have been made. The first heats were made on a basic bottom but now an acid bottom is being used because the nature of the materials is such that this can easily and economically be done.

The Hamilton Machine Tool Co., Hamilton, Ohio, has closed its plant temporarily, following a walkout of most of its machinists last week. No formal demand is understood to have been made on the company, and the trouble is said to be the result of members of the shop committee failing to get their old jobs back following a walkout last December.

The Carnegie Steel Co. will commence at once work on the rebuilding of the carpenter and pattern shop at Sharon, Pa., destroyed March 7 by fire, with a loss of about $100,000. The new structure will be of brick and steel construction.

Iron and Steel Markets

SALES AT LOWER PRICES

Anticipation of Further Readjustment

Pig Iron Sales at $25—Stabilizing Movement More Confused

Whatever price changes result from the meeting now on at Washington (Wednesday) the week's market, scant as business has been, has further emphasized the downward tendency. Reports have been widespread of sales of basic iron at $25 at furnace, representing a reduction of $5 a ton. One of these, assigned to the Chicago district, has been denied by the reputed sellers. The amount involved was 15,000 tons. An Ohio sale of 10,000 tons seems better established, and one in the East, also at $25.

Representing a similar decline in semi-finished steel is a sale of slabs to an Eastern mill at $40, while in heavy sheets there have been concessions of $6 a ton from the prices prevailing early in the year. Ferromanganese, spiegeleisen and ferrosilicon have all yielded, the first two being still conspicuously overproduced.

The week's delay has added to the problems of the steel manufacturers' committee. Merchant pig iron makers, at their separate meeting last week, formally declared against reducing their prices unless the way could be opened by reductions in raw material and labor costs. The class 3 steel works—those which must buy pig iron at the market price—strongly protested that reductions in their products, without a cut in pig iron, would close down their plants.

Among leading producers of steel there has been no change in the feeling that price reductions at this time will not produce the desired revival in buying. Reductions in copper, more drastic than have been proposed in steel, have not stimulated demand, it is argued; and the spelter market, with the price below the cost of well-equipped producers, has no semblance of life.

Meanwhile the Department of Labor at Washington has reinforced the position of the chief objectors to reductions in steel by widespread propaganda urging that high level prices are no temporary thing, but permanent. Buyers are told that in the absence of special reasons for declines in the case of particular products "it is safe to assume that prices are not going to drop."

Another Washington development is the statement from the Industrial Board that a general expectation of radical cuts in prices can thwart the whole stabilizing program; that the main thing is not so much the extent of the reduction as convincing the public that the new basis will be stable.

It must be said that the week has not clarified the situation but rather added to its confusion. The fact that the Government has no buying program and thus cannot give practical sanction to steel prices that may be fixed is a serious drawback.

Mill operations have fallen off this week, but it is still true that the Steel Corporation's output is relatively larger than that of the independent companies, due to the carrying over of considerable tonnages that were put on the books in 1917. The blowing out of merchant blast furnaces continues, several Alabama additions to the idle list being made in the past ten days.

In Western markets the more important producers of finished materials have been losing business lately because of the cutting of prices by smaller competitors.

The amount of steel bridge and building work put under contract in February was practically no greater than that in January. The total of the two months is 44,000 tons out of a year's capacity of 2,160,000 tons. In the winter of 1914-1915, before the war demand from Europe set in and when the fabricated steel business saw the lowest demand for years, the January-February total was about 95,000 tons, more than twice this year's.

A 9000-ton building projected in Chicago stands out prominently under the conditions. And in view of the price enigma, much interest attaches to the basis on which the Standard Oil Co. has placed with a Pittsburgh fabricator 9000 tons of tank work. A 6-ft. riveted pipe line in New Jersey, taking 4700 tons, has been revived.

Many Lake Superior iron mines have checked up operations, not less than 40 on the Mesaba and Cuyuna ranges having closed temporarily. Miners are getting $5.28 per day and surface labor $4.84—the highest scale ever paid in the region. Freight reductions are considered necessary by the mining companies if they are to meet the expectation of lower ore prices entertained by blast furnace men.

Exporters of steel have only moderate hopes for 1919 business. Whatever plans are worked out this year for American promotions abroad, the actual shipment of any steel involved might not mature before 1920.

In the past week there has been some sounding of the trade for prices on about 2000 tons of billets for England. Ocean freight is an uncertain factor, but at $20 for this item American billets at $35 to $37, seaboard, would be freely competitive with British steel as selling to-day.

An export transaction involving 2000 tons of plates, shapes and bars has been put through at 3c., New York, equivalent to 2.73c., Pittsburgh.

Pittsburgh

PITTSBURGH, March 18—(*By Wire*).

Since the postponement of the meeting to have been held in Washington a week ago, matters in the steel trade have been almost at a standstill, and any new business entered by the mills during the past week carried with it a tacit understanding that on any unshipped portions of such orders, prices in effect at the time shipments were made would apply. There has been some little business taken on this basis, but probably a larger amount has been entered by the mills with no price attached; in other words, whatever price may be adopted in Washington will apply on such orders.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Mar. 18, 1919	Mar. 11, 1919	Feb. 18, 1919	Mar. 20, 1918
No. 2 N. Philadelphia‡	$33.35	$36.15	$36.15	$34.25
No. 2, Valley furnace†	28.00	28.00	31.00	33.00
No. 2, Southern, Cin'ti†	34.60	34.60	34.60	35.90
No. 2, Birmingham, Ala.†	29.00	29.00	31.00	33.00
No. 2, furnace, Chicago*	31.00	31.00	31.00	33.00
Basic, deliv., eastern Pa.	33.90	33.90	33.90	33.75
Basic, Valley furnace	30.00	30.00	30.00	33.00
Bessemer, Pittsburgh	33.60	33.60	33.60	37.25
Malleable, Chicago*	31.50	31.50	31.50	33.50
Malleable Valley	31.50	31.50	31.50	33.50
Gray forge, Pittsburgh	31.40	31.40	31.40	32.75
L. S. charcoal, Chicago	38.85	38.85	38.85	37.50
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	55.00	55.00	55.00	55.00
O.-h. rails, heavy, at mill	57.00	57.00	57.00	57.00
Bess. billets, Pittsburgh	43.50	43.50	43.50	47.50
O.-h. billets, Pittsburgh	43.50	43.50	43.50	47.50
O.-h. sheet bars, P'gh	47.00	47.00	47.00	51.00
Forging billets, base, P'gh.	56.00	56.00	56.00	60.00
O.-h. billets, Phila.	47.50	47.50	47.50	50.50
Wire rods, Pittsburgh	57.00	57.00	57.00	57.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Common iron bars, Phila.	3.145	3.145	3.145	3.685
Common iron bars, Pitts.	2.90	2.90	2.90	3.50
Iron bars, Chicago	2.92	2.92	2.92	3.50
Steel bars, Pittsburgh	2.70	2.70	2.70	2.90
Steel bars, New York	2.97	2.97	2.97	3.095
Tank plates, Pittsburgh	3.00	3.00	3.00	3.25
Tank plates, New York	3.17	3.17	3.27	3.445
Beams, etc., Pittsburgh	2.80	2.80	2.80	3.00
Beams, etc., New York	3.07	3.07	3.07	3.195
Skelp, grooved steel, P'gh.	2.70	2.70	2.70	2.90
Skelp, sheared steel, P'gh.	3.00	3.00	3.00	3.25
Steel hoops, Pittsburgh	3.30	3.30	3.30	3.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Mar. 18, 1919 Cents	Mar. 11, 1919 Cents	Feb. 18, 1919 Cents	Mar. 18 1918 Cents
Sheets, black, No. 28, P'gh.	4.70	4.70	4.70	5.00
Sheets, galv., No. 28, P'gh.	6.05	6.05	6.05	6.25
Wire nails, Pittsburgh	3.50	3.50	3.50	3.50
Cut nails, Pittsburgh	5.00	5.00	5.00	4.00
Fence wire, base, P'gh.	3.25	3.25	3.25	3.25
Barb wire, galv., P'gh.	4.35	4.35	4.35	4.35
Old Material, Per Gross Ton:				
Carwheels, Chicago	$21.00	$21.00	$22.00	$30.00
Carwheels, Philadelphia	23.00	23.00	23.00	30.00
Heavy steel scrap, P'gh.	14.00	14.00	15.00	30.00
Heavy steel scrap, Phila.	14.00	13.75	14.00	29.00
Heavy steel scrap, Ch'go.	15.50	15.00	14.50	29.50
No. 1 cast, Pittsburgh	18.00	18.00	19.00	30.00
No. 1 cast, Philadelphia	21.00	21.00	23.00	30.00
No. 1 cast, Ch'go, net ton	22.00	21.00	19.50	27.50
No. 1 RR. wrot., Phila.	20.00	20.00	20.00	35.00
No. 1 RR. wrot., Ch'go, net	15.50	15.50	14.50	30.75
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.25	$6.00
Furnace coke, future	4.25	5.00	6.00	6.00
Foundry coke, prompt	5.00	5.00	5.00	7.00
Foundry coke, future	5.50	5.50	7.00	7.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	15.00	15.75	17.50	23.50
Electrolytic copper, N. Y.	14.75	15.00	17.00	23.50
Spelter, St. Louis	6.12½	6.15	6.35	7.50
Spelter, New York	6.47½	6.50	6.70	7.75
Lead, St. Louis	5.00	5.00	4.75	7.10
Lead, New York	5.25	5.25	5.00	7.25
Tin, New York	72.50	72.50	72.50	85.00
Antimony (Asiatic), N. Y.	6.75	7.00	7.12½	13.25
Tin plate, 100-lb.box, P'gh.	$7.35	$7.35	$7.35	$7.75

It is pointed out that some of the steel mills are now using upward of 75 per cent of scrap in their open-hearth furnaces, and for the past three or four weeks prices of heavy melting steel scrap have been $14 to $15 per ton. This has resulted in a heavy decrease in the cost of making steel, so that a larger reduction in prices of semi-finished steel is probably warranted than in pig iron. On some lines of finished steel, it is contended that there is very little room for a cut in prices. This refers particularly to wire products, the makers of wire and wire nails having claimed right along that the $3.50 basis on wire nails leaves very little profit and 3.25c. on plain wire only a fair profit.

Business in steel during the week was comparatively small, due entirely to the fact that customers are waiting advices as to prices to be adopted at Washington. In nearly all cases, where actual business was done, it was at a material reduction from what are regarded as official prices. It is stated that on some heavy gage sheets the prices named at the Washington conference in December were shaded $5 to $6 per ton. There has been at least one sale of 80 per cent ferromanganese at $130 per gross ton, delivered, a cut of $20 per ton from what has been regarded as the price. A sale of slabs has been made to an Eastern mill at around $40 per ton, shipping point. These are a few of the cases where prices were materially shaded, but concessions have been general in the past week, simply being a forerunner of what is expected from Washington.

Pig Iron.—It is definitely determined that No. 2 foundry iron has sold as low as $25 at Valley furnace, but this may have been resale iron. Reports are also current of a sale of 10,000 tons of basic iron made by a Youngstown steel interest at the reported price of $25, Valley furnace. The buyer of this iron has not been disclosed, but it seems probable the sale has been made. It is possible the buyer was guaranteed the new Washington price, but this is not known definitely. At all events, some furnaces seem to be conceding that the price of pig iron is to be reduced $5 per ton, and are already naming this reduction. In Bessemer and basic there has not been much inquiry, but there seems to be no doubt that Bessemer could also be bought very much lower than the recent price of $32.20 at Valley furnace, possibly $5 less. If a cut of $5 per ton is made in pig iron it means that most merchant blast furnaces that are not self contained as regards ore, coal and coke will have to go out of blast, as it is not believed any of them can make pig iron at $25 with present cost of fuels and labor. Several Valley furnaces claim their costs are about $30 per ton, and others say about $28 at furnace. None claim to be able to make iron as low as $25 at furnace. It is reported here that a Western interest has sold 15,000 tons of basic iron to an Indiana wire mill at $25, at furnace. We also note an inquiry in this market for 30,000 tons of basic iron for export to England, but no furnaces or dealers have yet quoted on the inquiry, and will not until it is known what is done at Washington as to prices. It seems pretty certain that the next month will see a large number of furnaces blow out, unable to meet the lower prices for iron. The prices given below, repeated from last week, no longer represent the market, which is probably $5 per ton less. We quote these prices until the new schedule made at Washington becomes known.

Basic pig iron, $30; Bessemer, $32.20; gray forge, $30; No. 2 foundry, $31; No. 3 foundry, $30.50; and malleable, $31.50; all per gross ton at Valley furnaces, the freight rate for delivery in the Cleveland and Pittsburgh districts being $1.40 per ton.

Ferroalloys.—Serious declines in prices on all kinds of ferroalloys have occurred in the past week. There has been one sale of a carload of ferromanganese, 76 to 80 per cent, at $130 delivered, made by an Eastern producer to a consumer in this district. A Youngstown consumer is in the market for 50 to 100 tons, and is

said to have been quoted $125 for 80 per cent delivered. Some resales of 50 per cent ferrosilicon were at about $90 per ton at furnace. Prices on spiegeleisen have declined fully $10 per ton. We now quote 80 per cent ferromanganese at $130, with a reduction of possibly $3 per unit for lower percentages. We quote 16 to 18 per cent spiegeleisen at $42 to $43 and $3.50 per unit higher or lower when the manganese content is above or below the standard. We quote 50 per cent resale ferrosilicon at about $90 delivered. It is somewhat doubtful whether manufacturers would make this price, owing to a higher cost of power, labor and other essentials. Prices on lower grades of Bessemer ferrosilicon and silvery iron are purely nominal, and will likely be lower when the result of the price conference at Washington is made known. These prices are as follows:

We quote 70 per cent resale ferromanganese at $150 to $175, delivered, and 16 to 18 per cent spiegeleisen, $42 to $43, f.o.b. furnace, an addition or deduction of $3.50 per unit being made when the manganese content is above or below the standard. Fifty per cent resale ferrosilicon is quoted at $90, delivered.

We quote 9 per cent Bessemer ferrosilicon at $52; 10 per cent, $54; 11 per cent, $57.30; 12 per cent, $60.60. We quote 6 per cent silvery iron, $39; 7 per cent, $40; 8 per cent, $42.50; 9 per cent, $44.50; 10 per cent, $47. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2.90 per gross ton, for delivery in the Pittsburgh district.

Billets and Sheet Bars.—Several local dealers in steel recently had representatives cover the entire territory where steel is sold to consumers and these representatives have returned home, stating they were unable to make any sales, even when they offered concessions in prices. A reduction offered of $3 a ton from so-called official prices did not bring any business. Reports are that an Eastern consumer has brought slabs from a near-by steel plant at about $40 per ton at mill. It is pointed out that steel mills have been using for some time 65 to 75 per cent of scrap, which they have been buying at very low prices, some as low as $14 per ton delivered. This will no doubt be fully considered at the conference in Washington on Wednesday. The prices named below are purely nominal, actual prices being lower, if any business were being placed.

Finished Iron and Steel.—The local finished iron and steel trades in the past week have been at a practical standstill. This is due to the fact that consumers will not place orders till it is known what action is taken at Washington on Wednesday in regard to prices, and, on the other hand, mills are not anxious to sell for the reason that they would have to adjust any prices quoted to the new basis of the Washington conference. Some business is said to have been taken in the past week, with prices left open, and to be whatever prices may be adopted at Washington. There have also been some few sales in the past week where the sellers guaranteed prices on any unshipped portions of contracts. Buying has hardly been large enough to speak of and what will happen after the prices adopted at Washington become known is a question. Many of the trade believe that there will not be any revival in the steel business until the peace conference is ended, also until the Government has settled the greater part of the claims against it now on file in Washington from companies that have made up material on the orders of the Government, which has not been taken out, and will not be. These claims aggregate hundreds of millions of dollars, and the fact that dozens of companies are deprived of this money is seriously crippling them in their operations, especially in raising the necessary funds to pay their heavy Government taxes. It is also pointed out that the country cannot expect much export business until financial conditions in the war region countries have been settled to some extent. Owing to chaotic conditions existing in the finished steel trade, we deemed it unnecessary this week to go into detail in the various items, as is our usual custom. The absence of buying and the fact that there are no actual prices in existence make the situation probably without precedent. Consumers are holding off and not buying a ton of material they can possibly avoid. The past week in finished steel products has probably been the quietest ever known in the history of the local steel trade. As usual, prices on many lines of finished steel are given on the Pittsburgh f.o.b. page, which in this issue is page 786, but it should be noticed that these prices are purely nominal and will likely be much lower as the result of the Washington conference. The demand for sheets and tin plate is extremely dull and reports are that prices on sheets have been shaded recently at least $5 per ton in anticipation of at least this large a cut at Washington. The price of tin plate is likely to be fixed on a lower basis than $7.35 per base box, but how much of a reduction will be necessary before large consumers will place their orders will have to be most thoroughly tried out. The demand for tubular goods, aside from oil country supplies, is very quiet, while some of the mills rolling iron and steel pipe have been operating at 75 per cent or more of capacity, it is said the greater part of their output has been going into stock to meet the heavy expected demand to come later. On the smaller items of finished steel such as nuts and bolts, rivets, shafting and screw stock, spikes and other products, it is claimed that demand for the past month or more has been in some cases not over 10 per cent of capacity. When our report for next week is written, the situation as regards prices on finished steel products will likely be cleared up. In the meantime we omit all prices.

Old Material.—There have been no signs of any buying in scrap, in spite of the fact that consumers fully recognize prices on all grades are very low and are possibly as low as they will go. That this is the case is shown by the fact that mills making scrap are now inclined to stop it, instead of trying to sell it in the open market at the best prices that could be obtained. Dealers who have yards have also decided to pile scrap, and there is not as much scrap material pressing the market to find sale as there was some time ago. What action will be taken at Washington as regards prices on scrap is unknown, but the opinion is ventured that scrap will be left to take care of itself. It has already done so, prices to-day on some grades being fully $15 per ton less than they were prior to Jan. 1, when the Government released control of prices. There has been a good deal of buying of turnings by blast furnaces in the past two or three weeks, the low prices at which they were selling allowing them to be used in the blast furnaces. Prices on turnings, as noted in our report last week, are firm and are 50c. to $1 per ton higher than the lowest point reached. In the absence of buying, and also of information as to what will be done at Washington in scrap prices, they are purely nominal.

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$14.00 to $15.00
No. 1 cast, for steel plants (nominal)	18.00 to 19.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	15.00 to 16.00
Compressed steel	11.00 to 12.00
Bundled sheet, sides and ends, f.o.b. consumers' mills, Pittsburgh district	11.00 to 12.00
Bundled sheet stamping	10.00 to 10.50
No. 1 busheling	13.00 to 14.00
Railroad grate bars	14.00 to 15.00
Low phosphorus melting stock	16.00 to 17.00
Low phosphorus melting stock (bloom and billet ends, heavy plates)	19.00 to 20.00
Iron car axles	31.00 to 32.00
Locomotive axles, steel	29.00 to 30.00
Steel car axles	31.00 to 32.00
Railroad malleable	13.00 to 14.00
Machine shop turnings	9.50 to 10.00
Cast iron wheels	21.00 to 22.00
Rolled steel wheels	16.00 to 17.00
Sheet bar crop ends (at origin)	19.00 to 20.00
Heavy steel axle turnings	11.00 to 12.00
Heavy breakable cast	18.00 to 19.00
Cast iron borings	9.50 to 10.00
No. 1 railroad wrought	18.00 to 19.00

Coke.—Blast furnace operators are anxiously awaiting the action to be taken on Wednesday in Washington as to coke prices. When the Government relinquished control of prices on coal and coke, effective from Feb. 1, there was very quickly a decline in prices, which has amounted to about $2 per ton in prices of furnace coke, and nearly as much in foundry. At pres-

ent best grades of blast furnace coke can be had for prompt shipment at $4 to $4.25 per net ton at oven, but some contracts for blast furnace coke for March shipments have been readjusted to as low as $4.25 per net ton at oven, some as low as $4.50 and in two or three cases some consumers are paying $5 per ton for furnace coke for March shipment, but it is the very highest quality of coke made. There is no demand for coke and there is still a good deal loaded on cars for which the makers are trying to find buyers and are offering it at very low prices. We quote best grades of blast furnace coke for prompt shipment at $4 to $4.25 per net ton at oven and standard makes of 72-hr. foundry coke at about $5 per net ton at oven. Output of coke in the upper and lower Connellsville regions for the week ending March 8 was 222,926 tons, a decrease from the previous week of nearly 2000 tons.

Birmingham

BIRMINGHAM, ALA., March 17.

Pig Iron.—Naturally the Birmingham iron market reached the dead point on the eve of the expected announcement from the conference on price schedule, but the undercurrent is more optimistic than it has been in weeks. Many expect a substantial resumption of purchasing to follow immediately on the heels of the new schedule. Growing belief is that uncertainty rather than high prices is what has created the stagnation. Scattering sales of carload lots for prompt delivery were made at market basis, there being no special inducement to meet prices in competitive territory in view of the absence of firm offers. The inquiry as to shaded prices in competitive territory was rather in the way of sounding out the trade. More than one maker now admits that $28 and $29 on a $31 basis must be and will be accepted in competitive area. The Woodward Iron Co. took the bull by the horns on Saturday, March 15, and banked fires in its only two active stacks, those at Woodward. They will be kept ready for resumption as soon as orders come in. Following is the roster of active stacks in Alabama now: Tennessee company, ~~five on basic~~ at Ensley, one foundry and one basic at Bessemer, one basic in Birmingham and one foundry at Oxmoor; Sloss-Sheffield Steel & Iron Co., two in Birmingham and one at Sheffield on foundry; Republic Iron & Steel Co., two on foundry; Alabama, two on foundry; Gulf States Steel Co., one on basic; Woodstock, Holt, Sheffield Iron Corporation and Talladega one each on foundry. A number of ore mines and other plants have been shut down coincident with the furnace stoppage. The Gulf States Steel Co. is operating 60 per cent in steel mills and Tennessee and Fairfield mills of the American Steel & Wire Co. are still at normal. The Tennessee company is maintaining a full proportion of basic iron output for its own use. Birmingham has entered an appeal to the Railroad Administration for a fabricating in transit rate on steel for the benefit of the Birmingham Steel Corporation. The Louisville district board refused it. The local rumor that the Tennessee company was to absorb the Woodward Iron Co. was finally denied by Judge Gary. The small tonnage of metal sold at $28 was largely off-grade iron disposed of by the Trussville furnace in the way of settlement. We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

Foundry, 1.75 to 2.25 silicon	$29.00 to $31.00
Basic	30.00

Cast-Iron Pipe.—The pipe people feel the first real thrill. It is not so much the actual new business, which is not large, but the volume of inquiry from all over the country, that seems to mean immediate business. Many public improvements projects are in the inception stage. Both water and sanitary pipe makers express more optimism than they have shown since the armistice.

Coal and Coke.—Consumers are buying only for prompt delivery, but this very fact serves to make them take local foundry coke instead of cheaper offerings from West Virginia. The standard 72-hr. price remains firm at $9, to which it was reduced from $9.75. The coal output is around 60 per cent of normal, but is of greatly improved quality, and fine grade of blacksmithing coal is again produced.

Old Material.—There is very little activity in the scrap market, and no further disposition on the part of the consumers to hammer it, because they realize that bottom-rock prices have been reached. Scrap dealers feel a trifle more hopeful than they have and are taking on stocks at a margin of profit on the basis of their sales prices. We quote per gross ton, f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	$10.50 to $11.00
No. 1 heavy steel	10.00 to 10.50
Cast iron borings	6.00 to 6.50
Machine shop turnings	6.00 to 6.50
Stove plate	13.00 to 13.50
No. 1 cast	19.00 to 19.50
Car wheels	19.00 to 19.50
Tramcar wheels	18.00 to 18.50
Steel axles	28.00 to 30.00
No. 1 wrought	18.00 to 18.50

Pittsburgh and Nearby Districts

About 500 veteran employees of the Carnegie Steel Co., Edgar Thomson steel works, Bessemer, held a reunion in the Hotel Scheneley, Pittsburgh, recently. The banquet was presided over by John S. Lowry, and was attended by many men who are prominent in the steel industry. Among those present were President H. D. Williams of the Carnegie Steel Co.; James Gayley, former general superintendent of the Edgar Thomson works; Vice-President D. G. Kerr of the United States Steel Corporation; President A. C. Dinkey of the Midvale Steel & Ordnance Co.; Thos. Morrison, director of the United States Steel Corporation; George E. Harris, former general superintendent of the Edgar Thomson works. An interesting feature of the banquet was the large number of fathers and sons present. Both, in some cases, were in the veteran class, having been on the Edgar Thomson plant payroll for 20 years or more.

Reports that the Pittsburgh Steel Co., Union Arcade, Pittsburgh, has bought the Alicia coke works of Capt. W. Harry Brown in the Connellsville region, are not confirmed. Officials of the two companies named declined to discuss the report.

The Jamison Coal & Coke Co., Greensburg, Pa., recently purchased, at a cost of about $1,000,000, a 575-acre tract of coal land in Perry Township, Fayette County, Pa. Immediate development of this property is planned, and the entire output of coal, which eventually will be 2000 tons daily, will be consigned to the by-product plants of the Bethlehem Steel Co., Bethlehem, Pa.

Scottdale blast furnace of the Scottdale Furnace Co., at Scottdale, Pa., has been blown out for relining and repairs. A new electric skullscraper is to be installed and other new equipment is to be added.

An explosion occurred last week at Clinton blast furnace of the Clinton Iron & Steel Co., Pittsburgh, but none of the employees was hurt. The furnace will be out of blast for possibly a week for repairs, and will resume again as soon as these are finished.

Greenville Plant Closed

PITTSBURGH, March 19—(*By Wire*).—Official announcement is made by the Carnegie Steel Co., Pittsburgh, that it has closed down indefinitely its Greenville works at Greenville, Pa., and has notified the Greenville Board of Trade that the plant will not again be operated. The equipment of this plant is not modern and it had only a small output, about 80,000 tons per year of steel bars and shapes. It was built in 1871 by P. L. Kimberly and associates, and was rebuilt in 1906 after having been practically destroyed by fire. The property will be sold or leased subject to the wishes of the Bessemer & Lake Erie Railroad, owned by the Carnegie Steel Co., which has large shops at Greenville.

Chicago

CHICAGO, March 18—(*By Wire*).

The sentiment of the iron and steel industry may be summed up by saying that quick action with regard to prices is imperative if wholesome conditions are to prevail. It is regarded as unfortunate that the price meeting of last week was postponed, and if something is not done quickly a break of some kind will come. In other words, if price reductions do not come in an orderly way, they will come in a disorderly way. Large steel producers whose procedure in regard to prices usually serves as guidance for those less important insist they have made no recessions, yet they say they are losing business in almost every direction because of cutting on the part of others. It does not follow that a great deal of business is being done; on the contrary, the market is almost stagnant in every direction, but where orders are placed following negotiation, concessions are made. The curtailment of production has started in earnest in this district. The plate mill of the leading independent has been idle since last Friday because of a lack of specifications. It has a large tonnage booked for foreign delivery, but the purchasers do not specify. The company may start up its mill again next week. It is producing steel at a somewhat better rate than that in finishing departments, 14 out of 22 open-hearths being operated.

The leading interest operated finishing departments last week about 88 per cent of capacity against 94 in the previous week, and this means that men have been laid off. It has lessened its output to accord with decreased demand from associated companies manufacturing wire and other products. The steel bar mills appear to be in the most comfortable position of any. With all the general quiet, so acute that it is distressing, a better showing is made in structural material. Bids are again requested for the 9000-ton building to be erected for Butler Brothers, Chicago. A building requiring 1400 tons is going up in Dallas, Tex. The Italian State Railways have placed 1000 underframes with the American Car & Foundry Co. It is hoped the Government will order the completion of ships well along in Pacific yards on which work was halted. Some of these yards have large stores of material. No market exists in pig iron. Old material shows a firmer tone, largely because dealers themselves are paying better prices.

Ferroalloys.—Until the resale ferromanganese now being offered is absorbed, the representatives of producers do not expect to do much business; meanwhile their prices are nominal. An Eastern producer of spiegeleisen continues to quote $50 furnace for 16 to 18 per cent, but some has been sold about $10 under this figure. A real market test is lacking.

We quote 70 per cent ferromanganese nominal at $175 delivered; 50 per cent ferrosilicon at $125 to $130, delivered, and 16 to 18 per cent spiegeleisen at $40 to $50, furnace.

Plates.—Curtailment of production is the feature in this product. The leading independent's plate mill has been idle since last Friday, but may resume again at the end of this week if sufficient orders are accumulated. A peculiarity of the situation with this mill is that it has a large export tonnage booked, but the foreign buyers are not specifying. As matters are at present, the plate capacity of the country is entirely beyond the country's needs. In this connection must be taken into account not only the new mills created during the war, but the augmented capacities of those long established. In some Pacific Coast shipyards, particularly where work has been stopped by Government order, there are some large stocks of plates, but it is hoped that these will eventually be used in the manner originally intended, especially where some ships are as much as 80 per cent completed.

The mill quotation is 3c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 4.27c. for plates out of stock.

Pig Iron.—At few times has the market been as inactive as it is to-day. On top of the more than sufficient supply which melters have in their yards or have under contract comes uncertainty as to what prices will prevail after negotiations are concluded in the east. In some directions there is pessimism as to what will follow after the proposed price reductions are announced, in view of the stocks and commitments of the foundries. That much resale iron is being offered at concessions is beyond question, but there are not enough sales to establish a market. Consumers continue to request that shipments be withheld, and iron is being piled in furnace yards as a consequence. A few inquiries for silvery have been satisfied by resale offerings at something under recent price levels. Some idea of the state of affairs may be gathered from the fact that two carloads off 5 per cent silvery high manganese iron was sold at $32 furnace, the iron coming from Middlesboro, Ky. Reports are current that a local interest has sold 25,000 tons of basic, but confirmation is lacking. While the regular distributers of charcoal pig iron are holding to recent quotations, an outsider who offered to sell charcoal iron at $1 per ton under these levels did not get the business. Agents of Southern producers say they are not surprised at reports of concessions on Southern iron, but they do not admit having made such sales themselves. The iron trade in general regards the situation as a bad one.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$38.70 to $39.00
Lake Superior charcoal, C to AA	40.70 to 42.50
Lake Superior charcoal, No. 6	41.20 to 41.50
Northern coke foundry, No. 1 silicon, 2.25 to 2.75	32.25
Northern coke foundry, No. 2 silicon, 1.75 to 2.25	31.00
Northern high-phosphorus foundry	31.00
Southern coke, No. 1 foundry and No. 1 soft silicon, 2.75 to 3.25	39.00
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75	37.25
Southern foundry, silicon, 1.75 to 2.25	36.00
Malleable, not over 2.25 silicon	31.50
Standard Bessemer	32.20
Basic	30.00
Low phosphorus (copper free)	52.50
Silvery, 7 per cent	45.80 to 47.00

Structural Material.—Although the situation of the moment shares the general inactivity, the prospects are for activity and this will most certainly materialize if a satisfying price cut is made. A new request is out for bids on the 9000-ton structure to be erected for Butler Brothers, Chicago. The Mosher Mfg. Co., Dallas, Tex., will fabricate 1393 tons required by an office building for W. T. Waggoner, Fort Worth, Tex. The Union Foundry Co. will supply 124 tons for an office and manufacturing building for the Bankers Supply Co., Chicago, and the Jackson-Richter Iron Works, Denver, will furnish 138 tons to build a boiler house for Armour & Co. at Denver. The bascule of the Rush Street bridge, Chicago, requiring about 3600 tons, will be fabricated by the American Bridge Co., but the approaches, which will take about 5000 tons, are yet to be let. The American Car & Foundry Co. has been awarded the contract for 1000 steel underframes, amounting to about 6500 tons, for the Italian State Railways.

The mill quotation is 2.80c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 4.07c. for material out of warehouse.

Cast-Iron Pipe.—The city of Chicago will let tomorrow 650 tons of pipe for which there has been made a special assessment. Fort Wayne, Ind., March 10 threw out bids on 1144 tons and will readvertise.

We quote per net ton f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $64.80; 6-in. and larger, $61.80; class A and gas pipe, $1 extra.

Bars.—With all producers of steel bars the situation is better than in most other products, especially in shipments. New business in all kinds of bars naturally is slow. Bar-iron makers continue to quote 2.92c. Chicago. Rail carbon steel is 2.80c f.o.b. mills.

Mill prices are: Mild steel bars, 2.75c., Pittsburgh, taking a freight rate of 27c. per 100 lb.; common bar iron, 2.92c., Chicago; refined iron bars, 3.65 to 4.40c.; rail carbon, 2.80c., Pittsburgh.

Wire Products.—Here, also, business shows a halt and no greater activity is expected until after the price readjustment.

Rails and Track Supplies.—Rumor has it that the Railroad Administration plans to let the railroads have

1,500,000 tons of rails when a way is found to pay for them, but there is no official confirmation. We quote:

Standard railroad spikes, 3.65c., Pittsburgh. Track bolts with square nuts, 4.90c., Pittsburgh. Tie plates, steel, 3c., Pittsburgh and Chicago; tie plates, iron, 3.30c., f.o.b. makers' mills. The base for light rails is 3c., f.o.b. maker's mill, with usual extras.

Sheets.—A continuance of the hand-to-mouth business is the feature, the makers in some instances, at least, not being able to see more than a few days ahead.

Chicago delivery out of stock regardless of quantity, No. 10 blue annealed, 5.17c.; No. 28 black, 6.22c. and No. 28 galvanized, 7.57c.

Mill quotations are 4.70c. for No. 28 black, 3.95c. for No. 10 blue annealed, and 6.05c. for No. 28 galvanized.

Bolts and Nuts.—The larger manufacturers producing the bulk of the output are holding firmly to their prices, but smaller producers are granting concessions. All have reduced stove bolts about 15 per cent.

Structural rivets, 5.67c.; boiler rivets, 5.77c.; machine bolts up to ⅞ x 4 in., 40 per cent off; larger sizes, 25 and 5 off; carriage bolts up to ⅞ x 6 in., 35 off; larger sizes, 20 and 5 off; box pressed nuts, square topped, 78c. off; hexagon tapped, 57c. off; coach or lag screws, gimlet points, square heads, 40 per cent off. Quantity extras for nuts are canceled.

Old Material.—The market is a little firmer, principally because dealers and brokers are themselves paying for material. A large company is in the market for 10,000 tons of melting steel; No. 1 cast continues in demand and strong, and turnings have brought $7. The dealers are firmly of the opinion that the bottom has been reached and that the turn upward is at hand, though they admit not a great deal has been done by consumers. The Wabash Railroad offers 400 tons of carwheels, and the Chicago, Milwaukee & St. Paul a list of which the principal item is 1000 tons of rerollers. Small lists come from the Northern Pacific, Belt Line Railway and Santa Fe.

We quote delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Iron rails	$21.00 to $22.00
Relaying rails	45.00 to 50.00
Carwheels	21.00 to 22.00
Steel rails, rerolling	16.00 to 16.50
Steel rails, less than 3 ft.	15.50 to 16.50
Heavy melting steel	15.50 to 16.00
Frogs, switches and guards cut apart	15.00 to 15.50
Shoveling steel	15.00 to 15.50
Per Net Ton	
Iron angles and splice bars	$19.00 to $20.00
Steel angle bars	14.50 to 15.00
Iron arch bars and transoms	22.50 to 23.50
Iron car axles	28.00 to 29.00
Steel car axles	22.00 to 23.00
No. 1 busheling	13.50 to 14.00
No. 2 busheling	9.50 to 10.00
Cut forge	14.50 to 15.00
Pipes and flues	12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	14.50 to 15.00
Steel knuckles and couplers	17.50 to 18.00
Coil springs	18.00 to 18.50
No. 1 cast	22.00 to 22.50
Boiler punchings	18.00 to 19.00
Locomotive tires, smooth	16.50 to 17.00
Machine shop turnings	6.00 to 7.00
Cast borings	9.00 to 9.50
Stove plate and light cast	15.00 to 15.50
Grate bars	14.50 to 15.00
Brake shoes	13.50 to 14.00
Railroad malleable	16.00 to 17.00
Agricultural malleable	14.50 to 15.00
Country mixed	9.00 to 10.00

Philadelphia

PHILADELPHIA, March 18.

There are many shades of opinion in the local steel trade as to what should and will be done with regard to price reductions at the conference in Washington on Wednesday between the Industrial Board of the Department of Commerce and the committee representing steel, pig iron and ore interests. Sales departments may or may not express the views of those who direct the policies of the steel companies, but at any rate it is apparent that the selling organizations wish the question disposed of as speedily as possible, so that whatever incentive the new prices give for renewed activity may be soon realized. Apparently there is none who dissents from the view that the reduction on steel products must be sufficient to establish confidence among buyers that the bottom actually has been reached, but there is a difference of opinion as to just how much of a cut will be needed to bring about this result. A few hold to the opinion that a $5 a ton reduction is sufficient, while many think that nothing less than $10 will satisfy buyers. A view expressed in some quarters is that it is not the amount of the reduction that is important, but the stabilization of prices for a period of several months so that buyers can provide for their requirements a little way into the future without fear that prices will be further reduced while they have stocks on hand. An argument advanced by some of the high-cost producers against a deep cut is that it would force many mills and blast furnaces to shut down, thus throwing men out of employment. They point out that one of the objects of Secretary Redfield's price stabilization plan is to keep labor fully employed, and that a move which will defeat that purpose will not be countenanced in Washington. Pig iron producers are trying to arrive at a basis for reductions. A cut of $5 a ton is talked of, but a good many in the trade advocate that the Pittsburgh and Birmingham basing points be re-established for the benefit of high-cost furnaces in Virginia, Tennessee and eastern Pennsylvania. This would mean a price of $25 a ton, Pittsburgh or Birmingham, for basic and $26 for No. 2 plain foundry.

Ferroalloys.—A sale of two carloads of 78 to 82 per cent ferromanganese has been made by a producer to a Pittsburgh consumer at $130 a ton delivered. An Ohio steel company is in the market for a small tonnage and is expected to close at the same price. Spiegeleisen is not in demand and could be obtained at $40, f.o.b. furnace, for 18 to 22 per cent, this being resale material.

Coke.—An occasional carload of foundry coke is being sold at $6, Connellsville.

Pig Iron.—Not in many years has the demand for pig iron in this market reached such a low point. Several sales offices have done absolutely nothing in the past week. In the aggregate a few hundred tons of iron has been sold in carload lots. Buyers are awaiting the action of the conference on prices in Washington, Wednesday. Predictions are that pig iron will be cut $5 a ton, though some argue for a $2 or $3 reduction. The principal question seems to be whether the reduction, whatever it is, shall apply on f.o.b. furnace prices, an agitation having been started in favor of re-establishing the Pittsburgh and Birmingham basing points for the benefit of high-cost furnaces in Tennessee, Virginia and eastern Pennsylvania. Thus eastern Pennsylvania basic would be quoted at $28.90, delivered Philadelphia, and No. 2 plain foundry, $29.90. If the $5 reduction were to apply on a furnace basis, the price would be $3 a ton lower or about $8. The Virginia furnaces have entirely abandoned the Birmingham basing, while a majority of eastern Pennsylvania furnaces still cling to that method of quoting. Should the Pittsburgh and Birmingham basing points be reestablished, it would not be of much advantage to Virginia furnaces in selling for shipment to Northern points because they would be obliged to meet the quotations of eastern Pennsylvania furnaces to get business. A Virginia furnace price of $26 for No. 2 plain foundry, plus a $6.50 freight rate from Birmingham, would make a nominal price of $32.50, delivered Philadelphia, but the quotation of eastern Pennsylvania furnaces would be $29.90 for the same grade of iron, a price which Virginia furnaces would be obliged to meet in such a market as now exists. On the other hand, if a straight $5 reduction on a furnace basis is agreed upon, the reduction for Virginia furnaces would be equivalent to $8.20 a ton, on sales for shipment to Philadelphia or vicinity. This, it is stated, would force nearly all of the Virginia furnaces to go out of blast because the selling price would be $22.80 base at furnace, or below their costs of production. A few small sales have been made by eastern Pennsylvania furnaces having a freight rate of $1.10 to Philadelphia on the basis of $31 for No. 2 plain iron, making the delivered price at Philadelphia $32.10. A majority of eastern Pennsylvania furnaces, however, still quote $34.90, delivered Philadelphia. We quote standard grades of iron for

delivery Philadelphia or vicinity as follows, except low phosphorus iron, which is quoted f.o.b. furnace:

Eastern Penna. No. 2 X (2.25 to 2.75 sil.)	$33.35 to $36.15
Eastern Penna. No. 2 plain (1.75 to 2.25 sil.)	32.10 to 34.90
Virginia No. 2 X (2.25 to 2.75 sil.)	36.35
Virginia No. 2 plain (1.75 to 2.25 sil.)	35.10
Basic	33.90
Gray forge	33.90
Standard low phosphorus (f.o.b. furnace)	51.00
Copper-bearing low phosphorus (f.o.b. furnace)	48.00

Billets.—No business is being done pending the outcome of the price conference in Washington. Several good-sized export inquiries on which steel companies have quoted have not been closed. We quote 4 x 4 in. open hearth billets for rerolling at $47.50, Philadelphia.

Plates.—There is a fair amount of inquiry for plates pending which may be closed when the new price is announced. One inquiry is for 15,000 tons for two oil storage plants which may be built in the East. There is considerable guesswork as to what the new plate price will be. Many sellers expect a reduction of about $10 a ton, but this, it is pointed out, would be disastrous for some of the high-cost mills, forcing them to shut down. Owing to the small amount of plates being rolled, the cost per ton at some mills in this district has increased to more than $70 a ton, which is above the selling price. This, of course, includes general overhead expense. One company states that on the present basis of operations it could not sell plates below 2.90c., Pittsburgh, without loss. New bids for steel for battleships Nos. 49, 50, 51 and 52 will be received up to April 4 by the Navy Department, about 11,000 tons of plates being required. For a fuel ship, an additional 3000 tons is wanted. The Emergency Fleet Corporation has organized a salvage department which will dispose of large tonnages of steel, largely plates and shapes. Some of the steel to be sold has already been fabricated and efforts are being made to discover ways in which it can be utilized other than as scrap. We quote sheared plates, ¼ in. and heavier, at 2.85c. to 3c., Pittsburgh, with a freight rate of 24½c. per 100 lb. to Philadelphia.

Structural Material.—Many large building projects are in the hands of architects, but structural steel and fabricating companies say that a substantial reduction in the price of shapes is not all that is needed to bring about a resumption of building activity. Other building materials are high in price, and the total cost of erecting an office building or apartment building is probably 75 per cent greater than before the war. In a typical office building of 12 to 15 stories, the average cost of fabricated steel is about 16 to 17 per cent of the total building cost, according to the estimate of a steel company, based on about 100 such buildings. Another factor which is holding back building construction is the attitude of bankers, who are not disposed to make large building loans under present conditions. Work on the new municipal pier to be built by the city of Philadelphia will not be begun for about 30 days. The contract was let to the F. W. Mark Construction Co., low bidder. It is said that many of the bids were predicated on a price for structural steel after April 1 of 2.30c. and 2.55c., a reduction of $10 or $5 a ton from present quotations. Bids for battleship steel to be closed by the Navy Department, April 4, include 3600 tons of shapes; for a fuel ship 800 tons of shapes will also be required. We quote plain material at 2.80c., Pittsburgh, with a freight rate to Philadelphia of 24½c. per 100 lb.

Bars.—A fair business in steel bars is coming to the mills from jobbers. These orders are for small lots and quick shipment. Bar iron business is extremely quiet. We quote soft steel bars at 2.94c., Philadelphia; common merchant iron, 3.145c.; refined iron, 3.895c., and best refined iron, 4.145c., Philadelphia.

Bolts, Nuts and Rivets.—There has been cutting of prices on bolts as well as rivets, one or two makers having quoted 50 and 10 per cent off on bolts, though the regular quotation is 40 and 10 per cent off. A new price schedule will probably be issued this week by some of the producers which will show lower prices. Makers of bolts, nuts and rivets will meet in Philadelphia on Wednesday to discuss the business situation.

Old Material.—The market for heavy melting steel is firmer because of the inquiry of a large Eastern steel company for 20,000 tons for second quarter delivery. A part of this material has been bought at prices approximating $14.50 and $14.75 delivered. Turnings for blast furnace use are also a little stronger, sales having been made at $11.50, delivered. Blast furnace borings have not been in demand, and can be bought for less than turnings. There has been a little buying of wrought pipe, and the price is a little firmer. We quote for delivery at consumers' works eastern Pennsylvania as follows:

No. 1 heavy melting steel	$14.00 to $15.00
Steel rails, rerolling	16.00 to 17.00
No. 1 low phosphorus, heavy, 0.04 and under	20.00 to 21.00
Iron rails	20.00 to 22.00
Carwheels	23.00 to 24.00
No. 1 railroad wrought	20.00 to 21.00
No. 1 yard wrought	19.00 to 20.00
Country yard wrought	12.00 to 15.00
No. 1 forge fire	12.00 to 13.00
Bundled skeleton	12.00 to 13.00
No. 1 busheling	15.00 to 16.00
No. 2 busheling	13.00 to 14.00
Turning (for blast furnace use)	10.50 to 11.50
Machine-shop turnings (for rolling mill use)	11.00 to 12.00
Cast borings (for blast furnace use)	9.50 to 10.50
Cast borings (clean)	13.50 to 14.00
No. 1 cast	21.00 to 22.00
Grate bars	18.00 to 19.00
Stove plate	18.00 to 20.00
Railroad malleable	18.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.00 to 17.50
Ungraded pipe	13.00 to 14.00

Cleveland

CLEVELAND, March 18.

Iron Ore.—Iron ore interests are awaiting action by the Washington conference on prices for the coming season. Their case will be presented at this conference by John A. Savage of Duluth. Ore men state that there has been no reduction whatever in mining costs and in view of the fact that their margin of profit was very low last year, they are very emphatic in their contention that ore prices cannot be reduced unless there is a corresponding reduction in labor costs or transportation. If the price question is disposed of at the Washington meeting, it is expected that a buying movement in a somewhat limited way will start up shortly. We quote f.o.b. lower Lake docks as follows:

Old range Bessemer, $6.65; old range non-Bessemer, $5.90; Mesaba Bessemer, $6.40; Mesaba non-Bessemer, $5.75.

Coke.—A slight improvement is noted in shipments of foundry coke, as some consumers who have been holding back on deliveries are now willing to take some of their fuel. The market is lifeless. Standard makes of Connellsville foundry coke are quoted at $6 per net ton at oven, but some loaded onto cars is being offered at $5.50. Inferior grades are being quoted at $4.50 to $5.

Pig Iron.—Cleveland producers are holding to regular prices on pig iron and during the week made several sales of foundry iron in lots around 200 tons for early shipment at $31 for No. 2. A local interest also made a number of small lot sales of foundry iron in the Pittsburgh territory at the regular price. An Indiana melter is taking 200 tons of foundry iron and the sale of a small lot of malleable iron is reported, both without a concession in price. In spite of these sales, foundry iron is being offered freely by at least one Valley furnace at $28 for No. 2. However, local producers seem inclined to adhere to regular prices until after action is taken at the Washington price conference. Very little inquiry is pending. A Northern Ohio implement manufacturer inquired for several hundred tons of foundry iron, but decided not to place the business, after being quoted regular prices. Southern iron is still being held at $31 Birmingham and car lots were sold during the week at that price, but it is practically admitted that an inquiry of any size would bring out a concession of probably $2 or $3 a ton. Some producers note a slight

improvement in shipping orders for foundry iron, as the melt of quite a few foundries has increased, but shipments of steel-making iron are being generally held up. We quote delivered Cleveland, as follows:

Bessemer	$33.60
Basic	30 40
Northern No. 2 foundry	31.40
Southern No. 2 foundry, silicon, 2.25 to 2.75	37.25
Gray forge	30.40
Ohio silvery, 8 per cent silicon	46.90
Standard low phosphorus, Valley furnace	51.00

Bolts, Nuts and Rivets.—The demand for bolts and nuts is light. While there is some price shading Cleveland makers appear to be holding quite firmly to the regular prices which they claim they will adhere to until action is taken on steel prices. Rivet specifications have improved, some orders up to 1000 tons on contracts having come from the shipyards. Prices on boiler and structural rivets are still irregular, and considerable weakness has developed on small rivets, which are generally quoted at 60 per cent off the list, but on desirable orders quotations from 60 and 5 to 60 and 10 off are being made.

Finished Iron and Steel.—Business in finished lines is almost at a standstill awaiting results of the Washington price conference. The only orders that are being placed are for material for which consumers cannot wait. Most of the inquiries coming out are accompanied with requests that mills guarantee prices, but these requests are generally met with refusals and orders are withheld. A canvass of the trade by members of sales organizations indicates that a considerable tonnage of steel, particularly plates, needed for early requirements, is being held up until the price question is settled. Sentiment among consumers generally favors a sharp price reduction, and the stabilizing of prices for at least six months. Many feel that with only a moderate cut in prices there will still exist the uncertainty as to whether prices have reached bottom. There are very few reports of price cutting, inquiries not being of sufficient size to warrant shading were the mills so inclined. Liberal specifications for alloy steel continue to come out from the manufacturers. Prices on this steel are still weak and irregular. The Standard Oil Co. is reported to have placed oil tank work with a Pittsburgh fabricator requiring 9000 tons of plates. A Cleveland construction firm is reported to have been the low bidder for a viaduct in Kansas City requiring several hundred tons of structural material. Contractors are figuring on a forge shop for the Willys-Morrow Mfg. Co., Elmira, N. Y., requiring 500 tons. There is a local inquiry for 900 tons of light rails for export. The demand for black and galvanized sheets during the week was fairly good, coming mostly in small lots from manufacturers who were unable to defer the placing of orders any longer. Demand for hard steel bars is light and some manufacturers are adhering to a 2.50c. price, although sales are reported at lower figures. Prices on cement-coated nails are being shaded 10c. per 100 lb. to $3.30. Jobbers quote:

Steel bars, 3.87c.; plates, 4.17c.; structural material, 3.97c.; No. 10 blue annealed sheets, 5.07c.; No. 28 black sheets, 6.12c.; No. 28 galvanized sheets, 7.47c.

Old Material.—The demand for scrap shows no improvement. Cleveland consumers are keeping out of the market, and only one mill in the northern Ohio territory has been purchasing any material recently. Following the stiffening of the market a week or two ago, there has been a little reaction. Dealers look for an early buying movement by the mills and paid fairly good prices to railroads for scrap, feeling that if they had to take this before the mills came in the market they could lay it down in the yards and realize a good profit when an advance did come. The mills, however, have not yet come in the market, and there is a great deal more scrap offered than there is a demand for. A few price changes have occurred during the week. Local producers have sold heavy melting steel scrap to dealers at $13.50, but some dealers are asking mills as high as $16.50 for this grade. Turnings and borings are dull, and the best price reported for the latter is $9.50 delivered western Pennsylvania mill. Railroad wrought scrap is about $1 a ton lower, and stove plate a little higher. Dealers believe that as soon as action is taken on steel prices at Washington, there will be a tendency on the part of consumers to do some buying and that scrap prices will improve. We quote delivered at consumers' yards in Cleveland and vicinity, per gross ton, as follows:

Heavy melting steel	$14.50 to $15.00
Steel rails, under 3 ft	15.50 to 16.00
Steel rails, rerolling	13.50 to 14.00
Iron rails	23.00 to 24.00
Iron car axles	29.50 to 30.00
Steel car axles	27.00 to 27.50
Low phosphorus melting scrap	16.00 to 16.50
Cast borings	9.00 to 9.50
Iron and steel turnings and drillings	7.25 to 7.75
Compressed steel	10.50 to 11 50
No. 1 railroad wrought	16.50 to 17.00
Cast iron car wheels	15.50 to 16.00
Agricultural malleable	12.50 to 13.00
Railroad malleable	13.00 to 14.00
Steel axle turnings	12.50 to 13.00
Light bundled sheet scrap	8.50 to 9.50
No. 1 cast	20.00 to 21.00
No. 1 busheling	13.00 to 13.50
Drop forge flashings, 10 in. and under	13.00 to 13.50
Drop forge flashings, over 10 in.	8.50 to 9.50
Railroad grate bars	15.00 to 16.00
Stove plate	16.50 to 17.00

British Iron and Steel Market

Export Position Better—Heavy Demand for Pig Iron—Belgian War Steel and Iron Output

(*By Cable*)

LONDON, ENGLAND, March 13.

The export position is improving, but everything depends upon prices of fuel. All import restrictions are being removed upon British Empire goods.

The Cleveland pig-iron market is still unsettled, with furnaces working irregularly and at great pressure for home delivery. The output of foundry iron is totally inadequate and neutral demand is unsatisfied. Ferromanganese export licenses are no longer necessary.

Domestic prices for bar iron are £17 5s.; marked bars, £20; iron plates and sheets, ¼ in. and heavier, £20 10s., and under ¼ in. to 3/16 in., £21. The allocation of steel available for tin plates has been increased. Galvanized sheets are easier at £28 10s.

The Belgian production of pig iron in 1914 was 1,454,000 tons; in 1915 it was 68,000 tons; in 1916 it was 128,000 tons and in 1917 only 8000 tons. The output of finished steel in Belgium in 1914 was 1,087,000 tons; in 1915, 136,000 tons; in 1916, 122,000 tons, and in 1917, 24,000 tons. In 1917 there was only one Belgian blast furnace working. Of the chief Belgian steel works out of 52 blast furnaces 32 have been destroyed; out of 50 converters, 28 have been destroyed, and out of 96 rolling mills, 63 have been demolished.

Following are the government fixed prices for steel per gross ton except where otherwise stated, f.o.b. makers' works, the figures in brackets being the official domestic prices and the others the official export prices:

Hematite pig iron: East Coast, £8 12s. 6d. ($41) [£6 2s. 6d.]; West Coast, £8 17s. 6d. ($42.20) [£6 7s. 6d.].
Ship, bridge and tank plates, £16 10s. ($78.45) [£14].
Boiler plates, £17 10s. ($83.21) [£15].
Ship, bridge and tank plates, thin, £19 10s. ($92.72) [£16].
Small angles, tees and flats, £20 ($95.10) [£16 10s.].
Beams, £16 2s. 6d. ($76.68) [£13 12s. 6d.].
Rails, 60 lb. per yd. and upward, £15 10s. ($73.70) [£13 7s. 6d.].
Rounds, squares and hexagons, £17 10s. ($83.21) [£14 5s.].
Billets and slabs for rolling, £13 10s. ($64.19) [£12 5s.].
Billets and slabs for forging, £15 ($71.32) [£12 15s.].
Bar iron, £20 ($95.10).
Tin plate, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 40s. to neutral countries; otherwise, 33s. 3d. ($7.90) [33s. 10½d.].
Tin plate bars [£12 5s. 2d.].
Galvanized sheets, £28 10s. ($135.52), domestic price.
Ferromanganese, £30 ($142.65) [£25].

The army gas mask may displace the masks now in use to combat fumes produced in the blast furnaces and other departments in the Steelton plant of the Bethlehem Steel Co. J. H. Butler, safety engineer at Steelton, is now conducting experiments with the mask, and has thus far found it quite effective. If adopted, it will be modified that some of its bulk may be eliminated.

New York

NEW YORK, March 19.

Pig Iron.—It is positively stated that basic pig iron has been sold in the East on the basis of $25, Eastern furnace, but no details as to the transaction are obtainable. It is understood, however, that the tonnage was not large. Although there has been some agitation in favor of retaining Pittsburgh and Birmingham as basing points, sellers as a rule report very strong sentiment against such a policy among buyers. Sellers express the conviction that such a system could not be maintained in a competitive market. They point to the experience following the panic of 1907, when Eastern furnaces attempted to maintain the same delivered price, but failed in doing so. The outlook for export business to England is very unfavorable at the present time owing to the fact that ocean freight rates to that country have advanced to $30. Some exporters have discounted an expected decline of $5 in the pig iron market and have cabled a price $5 below present quotations, taking a chance on buying at the lower price, but have not been able to place any tonnage even at $5 below the market. The only favorable news at the present time comes from foundries, many of which report fair increase in orders for castings. We quote prices as follows, delivered New York, for Northern and Southern grades:

No. 1 foundry, silicon, 2.75 to 3.25	$35.80
No. 2 X, silicon, 2.25 to 2.75	34.00
No. 2 plain, silicon, 1.75 to 2.25	32.80
No. 2 X, Virginia, silicon, 2.25 to 2.75	36.65
No. 1 Southern, silicon, 2.75 to 3.25	41.70
No. 2 Southern, soft (all rail), sil., 2.25 to 2.75	39.95
No. 2 Southern (all rail), sil., 1.75 to 2.25	38.70

Ferroalloys.—Producers are continuing to quote 80 per cent ferromanganese at $200, delivered, less $3 per unit below the 78 per cent analysis, but are taking no business at these prices. It is understood that this quotation may be reduced in the near future. Resale 80 per cent alloy is said to have been sold in carload lots in the last week as low as $130, delivered. An Eastern producer, who a short time ago sold 80 per cent alloy at $150, is reported to have sold several carloads since then at $130, but the testimony is conflicting as to whether this was 78 to 82 per cent alloy or 75 to 77 per cent material. Demand in general is as slack as ever and there seems no prospect of any activity in the near future. Spiegeleisen is quoted nominal at $40 to $45, furnace, depending on the anlysis required. Demand is exceedingly light. It is reported that Indian manganese ore has been offered in this country as low as 45c. per unit, the understanding being that the ore is available at Calcutta at 15c. per unit and, if shipped in ballast, it can be delivered at the American seaboard at about 45c. per unit. There is no change in the 50 per cent ferrosilicon market, resale material or material from producers being available on contract at from $95 to $120 per ton delivered, depending on the quantity and the delivery.

Cast-Iron Pipe.—On 500 tons for Passaic, N. J., the Camden Iron Works, Camden, N. J., was the lowest bidder at considerably below nominal recent quotations. The city of Bayonne, N. J., has again postponed awarding the contract for the pipe for which it has been in the market for a number of weeks. It is now understood that the order will not be placed earlier than from four to six weeks. Nominal prices for 6-in. and heavier are: $62.70, New York; for 4-in., $65.70; for 3-in., $72.70, and $1 additional for class A and gas pipe.

Finished Iron and Steel.—A round tonnage of tank quality steel has been sold under conditions which indicate the possibility that the mill has revived an old contract or has cut the present general level. It is understood that a considerable tonnage is yet to be placed. Another item of interest in the plate market is the fact that the Jersey City water pipe line, 72-in. in diameter, made up of riveted plates and involving 4700 tons of 5/16-in. plates, will be bid on on March 25; this incidentally is about the third time this project has been up for contracting. The fabricating trade is looking for betterment if the outcome of the Washington price stabilizing conference is convincing that a basis for some time has been reached; speculative ventures are not expected in any volume, but mainly in investment structures. An extension for a power house for the Public Service Corporation of New Jersey, taking 700 tons, is up for figures as is a drill hall in Philadelphia involving 600 tons. The market opinion shows a great deal of confusion over the so-called price stabilizing movement. There are both buyers and sellers who argue for drastic cuts and also for a maintenance of the present conditions of no Government intervention. We quote mill shipments as follows: Steel bars, 2.97c.; shapes, 3.07c.; plates, 3.17c. to 3.27c.; common bar iron, 3.17c.; refined bar iron, from selected scrap, 3.92c., and best refined iron, 4.17c., all New York.

Warehouse Business.—Jobbers are now facing a situation diametrically the opposite of war-time shortage, delayed shipment, etc. The volume of business is good considering the times, and is gradually increasing; but mill shipments which are being made on both old and new orders have been too heavy for the business in hand, and warehousemen are somewhat concerned to keep stocks from swelling beyond safe dimensions until after arbitrary price adjustments downward are ended. It is rather generally conceded among them that business will not grow apace until considerably lower prices prevail, and this is not looked for now. Brass prices are still nominal on account of the continued unsettled market on pig copper. Pig metals otherwise are stationary, and old metals are unchanged over the previous week's figures for the first time since the armistice. As a result of this overstocked condition, first-quarter prices on soft steel sheet, cold rolled, one pass, and also on galvanized sheet, have been overturned. No. 28 box annealed black sheet, cold rolled, one pass, is quoted at 6c. and No. 28 galvanized at 7c.; and it is reported that slightly lower offerings have been made. Other out-of-store prices are as follows: Steel bars, 3.97c.; sructural shapes, 4.07c.; plates, 4.27c.; No. 10 blue annealed sheets, 5.17c.; hoops, 4.57c.; bands, 3/16 in., Nos. 10 and 12, 4.57c.; shafting, plus 9 per cent of list.

Old Material.—The market seems considerably stronger, sentimentally. As one broker expressed it, "the revival of the market seems to be much nearer than first calculated." The same broker a month ago had expressed doubts of any considerable recovery for a year. Dealers seem to be unwilling to sell heavy melting steel until they can get $14 a ton for it at their yards and are therefore piling it. The main items of scrap were raised from 50c. to $1 the past week. Optimism is based on very few current sales, but rather on future prospects. Prices brokers are quoting to dealers, New York, follow:

Heavy melting steel	$11.50 to $12.00
Rerolling rails	13.50 to 14.00
Relaying rails, nominal	47.00 to 50.00
Iron and steel car axles	19.00 to 21.00
No. 1 railroad wrought	18.00 to 19.00
Wrought-iron track	12.50 to 13.50
Forge fire	8.50 to 9.50
No. 1 yard wrought, long	14.50 to 15.00
Light iron	5.50 to 6.50
Cast borings (clean)	10.00 to 10.50
Machine shop turnings	9.00 to 10.00
Mixed borings and turnings	7.00 to 7.50
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long	13.00 to 14.00
Stove plate	16.00 to 17.00
Locomotive grate bars	14.00 to 15.00
Malleable cast (railroad)	13.50 to 14.50
Old carwheels	21.00 to 21.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast	$22.50 to $23.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	21.00 to 22.00
No. 1 heavy cast, not cupola size	14.50 to 15.50
No. 2 cast radiators, cast boilers, etc.	16.00 to 16.50

A large new breaker, practically all steel, was placed in operation by the Lehigh Coal & Navigation Co. at the No. 11 colliery at Lansford, Pa., on Monday.

Buffalo

BUFFALO, March 17.

Pig Iron.—While some furnaces report conditions virtually the same as last week, dull and lifeless, with only very small sales, others state that interest on the part of users and sales has been a little better; in fact, one producing interest reports that several fairly good sized orders for prompt shipment were placed from this territory during the week. Furnacemen are suggesting to users that they allow all shipments possible to be made on existing contracts, as the attitude of producers is against piling. Sales of Southern iron, which are reported as being made at prices under the current schedule, are not affecting the Buffalo market, as Southern iron is not a factor in this territory, for even with favorable prices prevailing at Southern furnaces, the freight rate militates against much tonnage being marketed in this far Northern territory. Sales are made occasionally, but not as a rule in larger amounts than carloads, and for mixture purposes only. We continue to quote the same prices as last week, which are as follows, f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	$34.00
No. 2 X, 2.25 to 2.75, silicon	32.25
No. 2 plain foundry, 1.75 to 2.25, silicon	31.00
Gray forge	30.00
Malleable silicon not over 2.25	31.50
Basic	30.00
Basic, 1 to 1½ per cent mng	30.50
Basic, 1½ to 2½ per cent mng	31.00
Bessemer	32.20
Lake Superior charcoal, regular grades, f.o.b. Buffalo	38.50

Old Material.—Buying appears to be held in check in a large measure the past week, because with the expected price adjustment on finished products to a lower level, scrap consumers are keeping aloof until the effect of such price fixing can be determined as a stimulating factor in finished materials. If it has the expected effect, it is thought more active buying of scrap will result. Turnings and borings have shown some demand during the week, and there has been a little inquiry for stove plate. Prices for these commodities have been firmly held. One local producer of open-hearth products has just placed two more of its open-hearth furnaces in operation, and it is stated that about 70 per cent of Buffalo's open-hearth capacity is now in operation. The price of railroad malleable has dropped a little during the week, but the price of heavy melting steel is holding stiffly at $14 to $15 by most dealers, although consumers are maintaining a waiting attitude with regard to buying. One dealer, however, has offered some tonnage of heavy melting at a price under the prevailing schedule, but most dealers will not offer any large tonnages even at the full schedule price for this commodity quoted for the week. We quote dealers' asking prices as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel, regular grades	$14.00 to $15.00
Low phosphorus, 0.04 and under	19.00 to 20.00
No. 1 railroad wrought	18.00 to 19.00
No. 1 machinery cast	21.00 to 22.00
Iron axles	23.00 to 24.00
Steel axles	23.00 to 24.00
Carwheels	21.00 to 22.00
Railroad malleable	17.00 to 18.00
Machine shop turnings	7.00 to 8.00
Heavy axle turnings	13.00 to 14.00
Clean cast borings	9.00 to 10.00
Iron rails	21.00 to 22.00
Locomotive grate bars	16.00 to 17.00
Stove plate	17.00 to 18.00
Wrought pipe	13.00 to 14.00
No. 1 busheling	13.00 to 14.00
Bundled sheet stamping	11.00 to 12.00

Finished Iron and Steel.—The postponement of the conference that was scheduled for Wednesday, March 12, has caused practically all orders to be withheld, so that the week has been more quiet than any week since the armistice was signed. Everything in the way of new business seems to be almost at a standstill. In fact no orders whatever appear to be reaching sales-books, except such as cover specific needs to go into work already under contract. It may be said that for most lines of finished steel products prices are being maintained, but of course there are no inquiries for any tonnage sufficiently large to furnish a motive for price cutting. It is understood, however, that several quotations have been made on plates for shipment into Canada at concessions that represent a cut of approximately $5 per ton. So far as can be learned, these quotations are from mills making limited output. It is also understood that wire rods have been offered at somewhat less than present prices, a portion of the offerings being for overseas export.

St. Louis

ST. LOUIS, March 17.

Pig Iron.—Such interest as has been evidenced in the market seems to have halted to await the action in connection with the Governmental efforts to stabilize prices, particularly in connection with the iron and steel industry. There seems to be a feeling that the result will be a reduction of prices and in consequence there is no disposition to buy until it is determined just what is to be done. Some small sales of pig iron are being made from day to day, of car lots and the like, but these are for special purposes, or are for needs in which delivery is the all-important element. The industry, however, seems to feel encouraged that the near future will develop business and that the spring months will bring about activity which is now and has been for some time lacking.

Coke.—No business has appeared in coke, inasmuch as operating consumers are covered by existing contracts and there is no new business in the melting industry to occasion requirements for additional supplies of metallurgical coke. The domestic coke business is and has been very light because of the extremely open winter, and with spring so near no revival is anticipated.

Old Material.—Dealers in scrap are doing little except fill old contracts, though laying in stock when obtainable at good prices. No mills are operating except on old business. Lists out include the Wabash Railroad, 2200 tons; Mobile & Ohio, 800 tons; Missouri, Kansas & Texas, 1000 tons, and Frisco Railroad, 800 tons, all going at or above the market. There is a feeling that the market is about at the bottom and that there is little or no occasion to anticipate any further serious declines.

Per Gross Ton

Old iron rails	$22.00 to $23.00
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 ft	15.00 to 15.50
Relaying rails, standard sections, subject to inspection	40.00 to 45.00
Old carwheels	20.00 to 20.50
No. 1 railroad heavy melting steel	14.50 to 15.00
Heavy shoveling steel	14.00 to 14.50
Ordinary shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart	14.50 to 15.00
Ordinary bundled sheets, scrap	9.00 to 9.50
Heavy axle and tire turnings	8.00 to 8.50

Per Net Ton

Iron angle bars	$15.50 to $16.00
Steel angle bars	13.50 to 14.00
Iron car axles	26.00 to 26.50
Steel car axles	21.00 to 21.50
Wrought arch bars and transoms	18.00 to 18.50
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	14.00 to 14.50
Railroad springs	14.00 to 14.50
Steel couplers and knuckles	14.00 to 14.50
Locomotive tires, 42 in. and over, smooth inside	13.00 to 13.50
No. 1 dealers' forge	11.50 to 12.00
Cast iron borings	6.00 to 6.50
No. 1 busheling	12.50 to 13.00
No. 1 boilers cut to sheets and rings	9.50 to 10.00
No. 1 railroad cast	19.00 to 19.50
Stove plate and light cast	15.50 to 16.00
Railroad malleable	12.50 to 13.00
Agricultural malleable	11.00 to 11.50
Pipes and flues	11.00 to 11.50
Heavy railroad sheet and tank	10.00 to 10.50
Railroad grate bars	13.00 to 13.50
Machine shop turnings	6.00 to 6.50
Country mixed	10.50 to 11.00
Uncut railroad mixed	12.00 to 12.50
Horseshoes	13.50 to 14.00

Finished Iron and Steel.—In the finished products lines there is a waiting disposition apparent, more than during the past few weeks, presumably because of the Governmental price stabilizing situation. However, the feeling is growing that there will be additional demand.

for material within a short time and that the opening of spring will add to the business which has been and is now being placed. Warehouse material is moving slowly just now, and for stock out of warehouse we quote as follows:

For stock out of warehouse, we quote as follows: Soft steel bars, 4.04c.; iron bars, 4.04c.; structural material, 4.14c.; tank plates, 4.24c.; No. 8 sheets, 5.09c.; No. 10 blue annealed sheets, 5.14c.; No. 28 black sheets, cold rolled, one pass, 6.19c.; No. 28 galvanized sheets, black sheet gage, 7.54c.

Cincinnati

CINCINNATI, March 18—(*By Wire*).

Pig Iron.—In this territory there has not been enough business to test the market. Inquiry is practically dead. The trade is awaiting results of Wednesday's meeting in Washington, and to use a war term, an armistice has been practically in effect. During the past 10 days some effort has been made to bring out firm offers from melters, but these have been without result. Some Northern resale iron has openly been offered below $31, but this was not produced in the Hanging Rock district. Southern foundry iron is also at a standstill, but it does not seem that melters around here have contracts for any large quantities that they wish to dispose of, as they are not putting any of this iron back on the market. A general offer of resale basic iron held by a consumer in the Pittsburgh district has been made and it is understood that the price asked was $26.50, furnace. None has been sold to melters in this vicinity. If consumers could get a line on what prices will be during the last half it is predicted that there would be considerable business placed because, compared with former years, only a small percentage of them have provided for metal to be shipped during that period. It has been quietly announced that more furnaces will blow out in case the price is reduced. At present production of iron in southern Ohio is lower than it has been at any time during the past 12 months.

Based on freight rates of $3.60 from Birmingham and $1.80 from Ironton, we quote, f.o.b. Cincinnati:

Southern coke, No. 1 foundry and 1 soft	$35.85
Southern coke, No. 2 foundry and 2 soft	34.60
Southern coke, No. 3 foundry	34.10
Southern No. 4 foundry	33.85
Southern gray forge	33.60
Ohio silvery, 8 per cent silicon	49.30
Southern Ohio coke, No. 1	34.05
Southern Ohio coke, No. 2	32.80
Southern Ohio coke, No. 3	32.30
Southern Ohio malleable Bessemer	33.30
Basic, Northern	31.80
Standard Southern carwheel	51.60

Coke.—The New River district seems to be the only one that has not generally reduced prices. Late reports from the Connellsville field indicate that prices are very much muddled. Some off-grade foundry coke has been offered as low as $4 to $4.50 per net ton at oven, but standard brands are around $5.50 to $6, and in some cases producers are asking $6.50. Standard grades of furnace coke range from $4 to $5, but there is little contracting for either foundry or furnace coke. Wise County oven operators have reduced to $6.50 to $7 for foundry coke, but there is little furnace coke from that district sold in this territory. Pocahontas foundry coke averages around $6.50 at oven for standard brands.

Finished Material.—The warehouses all report very slack business, although there are some orders coming in for material urgently needed. The widely published reports that lower prices would be recommended at the Washington meeting March 19 cause a hesitancy on the part of all buyers. Mill agencies are not urging their customers to buy heavily for future delivery, and it seems to be the general idea of the trade to await more stable conditions. A lot of business is accumulating that only awaits something definite as to what future values will be before it is turned loose. This is especially true of structural material of all kinds. At present buyers are not willing to gamble on the future. Wire products are probably moving a little better than other kinds of finished material although specifications are still for small quantities. Steel pipe is in fair demand and some improvement in mill shipments is noted. There is very little demand in this territory for railroad track accessories.

The following are local jobbers' prices: Steel bars and small structural shapes, 4.13c. base; large rounds and squares 2 in. and over, 4.23c. base; plates, 4.48c. base; No. 10 blue annealed sheets, 5.48c.; steel bands, 3/16 in. and lighter, 4.98c. base (using the new band list). Reinforcing concrete bars, 4.25½c., and wire nails, $4.15 per keg base.

High-Speed Steel.—Most of the standard brands are now on a level of $1.80 per lb. Some high-speed steel can be purchased at $1.50, but leading makers are not inclined to meet this quotation. Business is slow, but as many users have allowed their stocks to grow low it is expected that when contracting does commence again purchases will be made on a larger scale than they have been conducted in the past two months, or more.

Old Material.—Business is almost at a standstill. Dealers have so few transactions to report that they hardly know what prices to quote on receipt of an inquiry. A proportionately larger quantity of scrap has been used by the foundries lately because of the wide difference in the cost of pig iron and scrap. Should this difference in values be shortened it is difficult to state what effect it would have on the market. Dealers' stocks are fairly large and although purchases made by them lately are only at bargain figures, they have not added to them to any considerable extent. Heavy melting steel scrap is still very dull. The following are dealers' prices f.o.b. cars Cincinnati and southern Ohio in carload lots:

Per Gross Ton		
Bundled sheet	$9.00 to	$9.50
Old iron rails	22.50 to	23.00
Relaying rails, 50 lb. and up	40.00 to	41.00
Rerolling steel rails	14.00 to	14.50
Heavy melting steel	12.00 to	12.50
Steel rails for melting	12.50 to	13.00
Old carwheels	15.00 to	15.50
No. 1 railroad wrought	13.00 to	13.50
Per Net Ton		
Cast borings	$5.00 to	$5.50
Steel turnings	5.00 to	5.50
Railroad cast	15.50 to	16.00
No. 1 machinery	17.00 to	17.50
Burnt scrap	11.00 to	11.50
Iron axles	23.00 to	23.50
Locomotive tires (smooth inside)	14.00 to	14.50
Pipes and flues	10.50 to	11.00
Malleable cast	11.00 to	11.50
Railroad tank and sheet	9.00 to	9.50

Nova Scotia Steel & Coal Co. Report

Increased net profits are revealed in the annual statement of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., for 1918. After deducting for depreciation and interest charges, they were $1,716,492, compared with $1,340,477 in 1917. The surplus carried forward a year before was $1,730,092, the amount now carried forward being $2,616,584. The volume of business during the past four years has been as follows: 1915, $7,896,374; 1916, $11,425,439; 1917, $12,359,113; 1918, $11,525,779. The largest item of assets, the mining property, real estate, buildings, plant, machinery and equipment, less depreciation, is valued at $23,229,766, and the total assets are $35,288,917, which is practically unchanged from last year.

Production shows practically no change in amount during the past three years. Material turned out follows: Coke, 110,829 tons; limestone, 77,162; dolomite, 7827; pig iron, 92,174; steel ingots made, 129,506; steel ingots cogged, 125,161; steel billets rolled, 104,753; shipments of finished steel forgings, etc., from New Glasgow, 93,343. Iron ore to the amount of 119,138 tons was shipped to North Sydney from Wabana.

The Eastern Car Works, one of the company's subsidiaries, built 3362 cars during the year, compared with 4190 the previous year. Orders for 550 50-ton general service cars and 500 50-ton flat cars were received from the Canadian National Railways early in 1919. Two ships were completed and two more are now under construction.

The company is experiencing a lessened demand for coal and steel, and the regulations of the British Government regarding the sale of iron ore, coupled with the shipping situation, have continued to prevent sales of ore.

IRON AND INDUSTRIAL STOCKS

No Definite Trend Shown—Action of Steel Men and Government Representatives Awaited

NEW YORK, March 17.

New factors were absent from the market last week, and the sustaining power of the old ones was somewhat weaker if anything, for the reason that the price adjustment conference of the Government representatives and the steel men was put over until this week and the details connected with railroad financing require some time before a decision is reached by the parties concerned. Steel company shares showed only the usual slight fluctuations.

The range of prices in active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	34⅜-36½	Int. Har. com.	117-129⅞
Allis-Chalm. pf.	89½-90¼	Int. Har. pf.	116½
Am. Can com.	46⅞-49⅛	Lackaw. Steel	69-72½
Am. Can pf.	102-103	Lake Supr. Corp.	20-20⅞
Am. Car & F. c.	90⅛-94¼	Midvale Steel	44-47⅜
Am. Car & F. pf.	113⅜-115½	Nat.-Acme	31-31⅛
Am. Loco. com.	66⅝-68¾	Nat. En. & St. c.	50⅜-51⅝
Am. Loco. pf.	105	N. Y. Air Brake	109½-115
Am. Radiator c.	285-290	Nova Scotia Steel	50-51¼
Am. Ship com.	110-110½	Pressed Steel c.	69½-72¾
Am. Ship pf.	86½	Ry. Steel Spg. c.	77½-83
Am. Steel Fdries.	80⅜-87½	Republic com.	80⅜-86
Bald. Loco. com.	86½-91¼	Republic pf.	102-105
Bald. Loco. pf.	106½	Sloss com.	54-59
Beth. Steel com.	65-68⅞	Sloss pf.	86-90
Beth. Steel cl. B.	65-69⅛	Superior Steel	36-36⅞
Case, J. I. pf.	93¾	Supr. Steel 1st pf.	98
Central Fdry. pf.	33	Transue-Williams	38⅝-40
Chic. Pneu. Tool.	64-64½	Un. Alloy Steel	41⅛-44⅜
Colo. Fuel	41-44⅛	U. S. Pipe com.	18¾-21¼
Cruc. Steel com.	64¾-70¼	U. S. Pipe pf.	52¼-56
Cruc. Steel pf.	95-97½	U. S. Steel com.	94½-98½
Gen. Electric	155½-160¾	U. S. Steel pf.	114⅝-115
Gt. No. Ore Cert.	42¾-44¼	Va. I., C. & Coke.	59-59¾
Gulf States Steel.	56-58¾	Westingh. Elec.	45¾-47½

Dividends

The American Brake Shoe & Foundry Co., quarterly, 1¾ per cent on the common and 3 per cent on the preferred, payable March 31.

The Canadian Car & Foundry Co., quarterly, 1¾ per cent on the preferred, payable April 10.

The J. I. Case Threshing Machine Co., quarterly, 1¾ per cent on the preferred, payable April 1.

The Great Northern Iron Ore Properties, $2, payable April 9.

The International Harvester Co., quarterly, 1½ per cent on the common, payable April 15.

The LaBelle Iron Works, quarterly, 1 per cent and extra 2 per cent on the common, and 2 per cent on the preferred, payable March 31.

The Sloss-Sheffield Steel & Iron Co., quarterly, 1¾ per cent on the preferred, payable April 1.

The Steel Products Co., quarterly, 1¾ per cent, payable June 1.

The United Shoe Machinery Co., quarterly, 50c. on the common and 37½c. on the preferred, payable April 5.

Colorado's Reduced Earnings

The Colorado Fuel & Iron Co. has just issued its twenty-seventh annual report for 1918. Total net income was $8,101,111 for the past year, contrasted with $9,473,578 for 1917. Production was practically equal in amount to the preceding year, the following being the figures: Iron ore mined, 809,491 tons; limestone quarried, 452,986; pig iron produced, 432,406; coal mined, 4,455,881; coke manufactured, 800,638; finished iron and steel, 478,916 tons. During the last two years, the total sum of $8,017,500 was expended for new constructions and additions, no part of which was made necessary solely by war demands. An actual 8-hr. day was established at the steel works in November instead of the 12-hr. day which had previously prevailed.

Pittsburgh Steel Co. Buys Coal Lands

UNIONTOWN, PA., March 19.—A deal involving a large amount of money has been consummated whereby the Pittsburgh Steel Co. becomes the possessor of Alicia No. 1 and Alicia No. 2 mines, 2400 acres of Fayette county and Greene county coal, the marine ways at Alicia, and a fleet of river tugs and barges, numbering three boats and about 50 barges. W. Harry Brown, Pittsburgh, made the sale, which has been reported as being under negotiation for some time.

It involves one of the best operations in the western Pennsylvania fields. Alicia No. 1 works are at Brownsville, and the No. 2 works at Grays Landing, Greene County, a short distance away. The marine ways at Alicia are declared to be the most complete on either the Monongahela or Ohio rivers.

Industrial Finances

Directors of American Steel Foundries have approved the issuing of $25,000,000 7 per cent preferred stock, part of which may be used for the purchase of additional property, the Griffin Wheel Co. having been mentioned. Stockholders will vote on the proposition April 22.

Yale & Towne Mfg. Co. earned $28.18 a share on common stock in 1918, compared with $40.21 of the previous year. Net profits of 1918 were $1,396,423.

The net profit of Penn Seaboard Steel Corporation for 1918 was $457,661. Voting trust certificates for capital stock without nominal or par value were admitted to trading on the New York Stock Exchange last week. Net sales for the year amounted to $9,744,205, and the total income was $811,799.

The report of the Standard Sanitary Engineering Co., Pittsburgh, issued last week, shows net earnings for 1918 of $3,148,068. After all deductions, including $303,336 paid in dividends on the preferred stock, there remained $1,630,653, equivalent to 27 per cent earned on the $6,000,000 common stock. After the payment of $600,000 in dividends on the common stock there remained $1,030,653 surplus for the year. The total surplus and reserves at the close of the fiscal year amounted to $7,385,846.

The Chandler Motor Car Co. earned $31.35 per share in 1918, compared with $34.03 of 1917. At the time of the armistice the company was producing 10 19,000-lb. artillery tractors a day. The regular output for the year was 9172 cars, which the company expects to exceed greatly in 1919.

The semi-annual meeting of the Page Steel & Wire Co. plants at Monessen, Pa., and Adrian, Mich., with general offices at the latter place, was held on Feb. 26. Out of the earnings of $261,857 compared with $323,579 in 1917, the sum of $98,218 was authorized to be charged off from merchandise as of Dec. 31, 1918, on account of depreciation from inventory values. The statement issued to the stockholders of the company reported that on account of unsettled business conditions, due to the readjustment period, no dividends were declared on the first and second preferred stock, or on the common stock of the company, for the period July 1 to Dec. 31, 1918.

Net earnings increased but surplus decreased in 1918, according to the annual report of Independent Pneumatic Tool Co., Chicago. The former totaled $1,179,540 for 1918, and $819,636 for the year before, and the latter was $524,968, against $530,571 for 1917.

The balance sheet of the Penn Seaboard Steel Corporation, as of Dec. 31, 1918, shows a surplus of $4,926,016. Real estate, plant, and equipment are valued at $7,018,767.

The Southwark Foundry & Machine Co., 430 Washington Avenue, Philadelphia, recently acquired by the Baldwin Locomotive Works, was secured by this company for a total consideration of $650,000, representing the par value of the stock. During the past months the Baldwin company has installed machinery and tools at its locomotive works to the amount of $610,000, and traveling cranes to the total of $300,000.

The Charcoal Iron Co. of America has issued $1,400,000 of 7 per cent serial gold notes to be used in plant expansion. The company operates charcoal iron furnaces in the Upper Peninsula of Michigan and in Wisconsin.

The net income available for the common stock of the Submarine Boat Corporation on 1918 earnings was $172,779, compared with $1,248,099 for the year before. In calculating the net, the sum of $27,320, the excess of cost over market value of Liberty bonds was charged off. The largest item among the assets is "work in progress," which totals $52,779,120.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, $1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is $1.315, minimum carload 40,000 lb.; and $1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload 46,000 lb.; Denver, 99c., minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.80c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barbed wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 58 per cent off list for carload lots, 57 per cent for 1000-rod lots, and 56 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	$4.20 base
Large boiler rivets	$4.30
7/16 in. x 6 in. smaller and shorter rivets	50-10 per cent off list
Machine bolts h.p. nuts, ⅜ in. x 4 in.:	
Smaller and shorter, rolled threads	50-10-5 per cent off list
Cut threads	50-5 per cent off list
Larger and longer sizes	40-10 per cent off list
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:	
Smaller and shorter	40-10 per cent off list
Larger and longer	35-5 per cent off list
Carriage bolts, ⅜ x 6 in.:	
Smaller and shorter, rolled threads	50-5 per cent off list
Cut threads	40-10-5 per cent off list
Larger and longer sizes	40 per cent off list
Lag bolts	50-10 per cent off list
Plow bolts, Nos. 1, 2, 3	50 per cent off list
Hot pressed nuts, sq., blank	2.50c. per lb. off list
Hot pressed nuts, hex., blank	2.30c. per lb. off list
Hot pressed nuts, sq., tapped	2.30c. per lb. off list
Hot pressed nuts, hex., tapped	2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank	2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped	2.00c. per lb. off list
Semi-finished hex. nuts:	
⅝ in. and larger	60-10-10 per cent off list
9/16 in. and smaller	70-5 per cent off list
Stove bolts	70-10 per cent off list
Stove bolts	2½ per cent extra for bulk
Tire bolts	50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. x 4½ in. and heavier, per 100 lb., $3.70, in lots of 200 kegs of 200 lb. each, or more; track bolts, $4.90. Boat spikes, $5.05 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Prices of terne plate are as follows: 8-lb. coating, 200 lb., $14.50 per package; 8-lb. coating, I. C., $14.80; 12-lb. coating, I. C., $16.50; 15-lb. coating, I. C., $17.50; 20-lb. coating, I. C., $18.75; 25-lb. coating, I. C., $20.00; 30-lb. coating, I. C., $21.00; 35-lb. coating, I. C., $22.00; 40-lb. coating, I. C., $23.00 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.70c. from mill. Refined iron bars, 3.50c.; common iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card.

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	47	20½	⅛ and ¼	26	+1
½	51	36½	⅜	27	List
¾ to 3	54	40½	½	31	13
			¾ to 1½	36	29

Lap Weld

2	47	34½	1¼	21	6
2½ to 6	50	37½	1½	28	14
7 to 12	47	33½	2	29	15
13 and 14	37½	..	2½ to 6	31	18
15	35	..	7 to 12	28	15

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	43	25½	⅛, ¼ and ⅜	25	8
½	48	35½	½	30	17
¾ to 1½	52	39½	¾ to 1½	36	21
2 to 3	53	40½			

Lap Weld, extra strong, plain ends

2	45	33½	1¼	22	7
2½ to 4	48	36½	1½	28	14
4½ to 6	47	35½	2	30	17
7 to 8	43	29½	2½ to 4	32	20
9 to 12	38	24½	4½ to 6	31	19
			7 to 8	23	11
			9 to 12	18	6

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel	Per Net Ton	*Charcoal Iron*	Per Net Ton
3½ to 4½ in.	37	3½ to 4½ in.	12½
2½ to 3¼ in.	27	3 to 3¼ in.	+ 2
2¼ in.	20½	2½ to 2¾ in.	+ 4½
1¾ to 2 in.	16	2 to 2⅜ in.	+19½
		1¾ to 1⅞ in.	+32

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$334	1¾ in.	$214
1¼ in.	274	2 to 2½ in.	154
1⅜ in.	264	2¾ to 3¾ in.	174
1½ in.	214	4 in.	194
		4½ to 5 in.	214

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

Blue Annealed—Bessemer	Cents per lb.
No. 8 and heavier	3.85
Nos. 9 and 10 (base)	3.90
Nos. 11 and 12	3.95
Nos. 13 and 14	4.00
Nos. 15 and 16	4.10
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.50
Nos. 22 and 24	4.55
Nos. 25 and 26	4.60
No. 27	4.65
No. 28 (base)	4.70
No. 29	4.80
No. 30	4.90
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.05
Nos. 12 and 14	5.15
Nos. 15 and 16	5.30
Nos. 17 to 21	5.45
Nos. 22 and 24	5.60
Nos. 25 and 26	5.75
No. 27	5.90
No. 28 (base)	6.05
No. 29	6.30
No. 30	6.55
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.50
Nos. 17 to 21	4.55
Nos. 22 to 24	4.60
Nos. 25 and 27	4.65
No. 28 (base)	4.70
No. 29	4.75
No. 30	4.75
Nos. 30½ and 31	4.80

Metal Markets

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
	Electro-		New	New	St.	New	St.
	lytic	Lake	York	York	Louis	York	Louis
Mar. 12	15.75	15.00	72.50	5.25	5.00	6.50	6.15
13	15.75	15.00	72.50	5.25	5.00	6.50	6.15
14	15.50	15.00	72.50	5.25	5.00	6.50	6.15
15	15.50	15.00	....	5.25	5.00	6.50	6.15
17	15.25	15.00	72.50	5.25	5.00	6.47½	6.12½
18	15.00	14.75	72.50	5.25	5.00	6.47½	6.12½

NEW YORK, March 18.

All the markets are steady with little change one way or the other. The copper market is very dull with buying of small proportions. The tin market continues stagnant. Inactivity pervades the lead market with prices firm. The spelter market is quiet with the trading easy. Antimony is lower.

New York

Copper.—The larger producers are generally quoting 15c., New York, for electrolytic copper and the smaller ones slightly lower. It is generally conceded that an attractive offer would bring as low as 14.50c. to 14.75c. Sales have been small in the past week, some estimates placing the total at not over 12,000,000 lb. We quote electrolytic copper at 14.75c., New York, and Lake copper, nominal at 15c., New York, with inquiry light. A British consumer is inquiring for 2000 gross tons of selected copper (99.75 per cent), for delivery over the next 12 months and has offered £60 ($285.30) per ton. The return toward the end of this month of the representatives of the Copper Export Association, who went to Europe to investigate Europe's need for copper, is awaited with interest.

Tin.—The market is devoid of any feature. The only matter of interest is that there is more attention being paid to the question of buying for future shipment against the possibility of an early lifting of the American export restrictions which many think will take place by June 1. There has been, however, very little buying of this nature thus far. Spot Straits tin is quoted at the Government price of 72.50c., New York, with American 99 per cent metal available at about 68c., New York. It is understood that metal for future shipment from the Far East could now be purchased at about 52c. per lb., were imports permitted. The statement is made that the American Smelting & Refining Co. produced 19,868,000 lb. of refined tin from Bolivian concentrates in 1918 as against 12,130,000 lb. in 1917. Arrivals of tin thus far in March have been 1425 tons, all at Pacific ports. The London price for spot Straits yesterday was £239 per ton, against £243 per ton a week ago.

Lead.—The market is quiet and has turned very dull. The demand of a week ago has almost completely disappeared. The market, however, is steady at 5.25c., New York, or 5c., St. Louis. It is claimed that outside sellers would shade this price on an attractive offer, but this has not been tested.

Spelter.—Prime Western for early delivery is quoted at 6.12½c. to 6.15c., St. Louis, or 6.47½c. to 6.50c., New York. A better demand from consumers and dealers is reported but this has not yet developed into much business. With the stabilizing of steel prices it is expected that there will be a large demand for sheet bars from galvanizers and consequently more buying of spelter, for it is figured that galvanizers are not heavily stocked.

Antimony.—The market is quieter and easier with wholesale lots quoted at about 6.75c., New York, duty paid, for spot and early delivery.

Aluminum.—The market is quiet with No. 1 virgin metal, 98 to 99 per cent pure, quoted at 29c. to 31c., New York, for early delivery.

Old Metals.—The market is quiet and prices are generally unchanged. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	15.50
Copper, heavy and wire	14.50
Copper, light and bottoms	12.25
Brass, heavy	11.25
Brass, light	7.50
Heavy machine composition	15.00
No. 1 yellow rod brass turnings	8.00
No. 1 red brass or composition turnings	12.00
Lead, heavy	4.75
Lead, tea	4.00
Zinc	5.25

St. Louis

ST. LOUIS, March 17.—Non-ferrous metals have been quiet during the week with the close on lead in car lots at 5.10c. and spelter at 6.15c. In less than car lots the quotations have been: Lead, 5.75c. to 6c.; spelter, 6.75c. to 7c.; tin, 72½c.; copper, 18½c. to 19c.; Asiatic antimony, 8c. In the Joplin district zinc ore has been easier, ranging down to $41 per ton, basis 60 per cent, with the average for the week at $42 per ton. Lead ore, basis 80 per cent, weakened down to $61 per ton, with the average for the week for the district $62 because of higher prices earlier in the week. Calamine ranged from $25 to $28 per ton, basis 40 per cent, and the average for the week for the district was $28 per ton because of premium grades sold. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 6c.; heavy yellow brass, 8.50c.; heavy red brass, 12c.; light copper, 10c.; heavy copper and copper wire, 12c.; pewter, 35c.; tinfoil, 40c.; zinc, 3c.; lead, 4c.; tea lead, 3c.

Chicago

CHICAGO, March 18.—A fair tonnage of copper has been purchased. Lead is quiet but firm. Spelter continues unsatisfactory, though it is believed prices have touched the bottom. Only day to day demand exists for prompt tin, but there is some trading in April delivery subject to removal of Government restrictions. Antimony is a little easier because of freer offerings. We quote copper at 16c. to 16.50c. for carloads; tin, 72.50c.; lead, 5.10c. to 5.15c.; spelter, 6.25c. to 6.37½c.; antimony, 8c. to 8.50c. On old metals we quote copper wire, crucible shapes, 12.50c.; copper clips, 12c.; copper bottoms, 10.50c.; red brass, 12.50c.; yellow brass, 8c.; lead pipe, 3.50c.; zinc, 4c.; pewter, No. 1, 32c.; tinfoil, 37c., and block tin, 50c., all these being buying prices for less than carload lots.

Imports and Exports of Copper

WASHINGTON, March 18.—The Bureau of Foreign and Domestic Commerce has compiled the following statistics of the imports and exports of copper, by classes, in January, 1919:

	Gross Tons	Copper Contents, Pounds	Dollars
Imports			
Ore	11,697	2,919,767	643,777
Concentrates	9,379	2,505,000	647,600
Matte and regulus	4,341	4,501,623	894,623
Unrefined, etc., in bars	....	5,065,683	1,256,250
Refined, in bars, plates, etc.	....	4,019,469	983,753
Old, etc., for remanufacture	....	1,676,525	258,446
Composition metal	....	3,141	565
Copper manufactures	....	.....	.....
Exports			
Ore	1,530	318,946	65,303
Concentrates	....	.....	.....
Unrefined, etc., in bars	....	.....	.....
Refined, in bars	....	72,757,340	18,381,796
Composition metal	....	8,882	3,238
Old and scrap	....	25,040	4,518
Pipes and tubes	....	356,340	137,861
Plates and sheets	....	3,130,974	884,669
Wire, except insulated	....	3,289,411	963,793
All other manufactures	....	.....	526,138

The Chicago Pneumatic Tool Co. has opened offices and warehouss at Tulsa, Oklahoma, and at El Dorado, Kas. Stocks of repair parts and the company's products will be maintained at both of these points.

PERSONAL

L. E. Thomas has resigned as vice-president and general manager of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., to become president of the Reading Iron Co., Reading, Pa., to which position he was elected March 15. John E. McCauley, who has been assistant general manager for the past nine years, was elected vice-president and general manager to succeed Mr. Thomas. Mr. McCauley received his education at the Pennsylvania State College and Swarthmore College and served a special apprenticeship at the Standard Steel Works at Burnham, Pa., and the Baldwin Locomotive Works at Philadelphia. He was with the Solid Steel Casting Co., Chester, Pa., for four years and went to the Birdsboro Steel Foundry & Machine Co. in 1910 as manager of sales, having been made assistant general manager in 1915.

William D. Mainwaring, who has been engaged in special research work for Henry Disston & Sons, Inc., Philadelphia, has established himself at 1118 Chestnut Street, Philadelphia, as a consulting metallurgist. He was formerly identified in laboratory and research work for the Railway Steel Spring Co. at Detroit.

Thomas Price, who was with the Midvale Steel Co. for over 20 years, is now associated with the Aborn Steel Co., Inc., at 22 Clarke Street, New York.

J. E. Dockendorff & Co., Inc., 20 Broad Street, New York, announce the following: J. E. Dockendorff will shortly return after an extended trip to Europe, during which he established offices in England, Spain and other countries, the firm having maintained offices in France and Italy for several years. A. W. Hartigan, in charge of electrical equipment and raw materials of electrical industry, has recently returned from Japan, where connections were made with prominent Japanese firms to handle the commodities represented by this house. Captain D. E. Sawyer, formerly of the Illinois Steel Co., but more recently in the Steel Section of the War Industries Board, has taken the position of manager of the steel department.

The Black & Decker Mfg. Co., Baltimore, announces that Charles W. Unbehaun, formerly New York City and general eastern salesman for the Bailey-Drake Co., Chicago, has joined the Black & Decker organization in the capacity of branch manager. He will cover eastern New York and Connecticut.

Frank Hodson, president Electric Furnace Construction Co., Philadelphia, returned from Europe Feb. 24, accompanied by Harry Etchells, one of the inventors of the Greaves-Etchells furnace. Mr. Etchells, during his short stay in America, is to act in an advisory capacity on the latest European practice.

H. W. Finnell, formerly manager War Industries Bureau, Illinois Manufacturers' Association, Washington, has become associated with the Factory Products Corporation, 2 Rector Street, New York.

Robert T. Lozier has become special representative of the Standard Underground Cable Co., Pittsburgh.

Joseph J. McKee has opened an office at 1170 Broadway for the sale of new and used machinery of every description.

Edward N. Hay, captain of Ordnance in the Army, has just been discharged and has joined the staff of the Robert T. Pollock Co., Boston. Mr. Hay has been making a study of the latest manufacturing processes and methods of organization of some of the best known companies in France, England and Scotland, made in the course of his work on tanks as a member of the staff of the Anglo-American commission.

Captain George Sykes, R. A. F., A. M. I. E. E., who has been in this country nearly four years, attached to the British War Mission in a commercial capacity, will sail for Europe in May. He has joined the Dutilh-Smith-McMillan Co., an international house, as London manager of its engineering and railroad departments. For many years prior to the war, Captain Sykes was connected with electrical manufacturers in the sales and engineering departments and power and traction corporations. His New York address is 50 Broad Street, and his London office is Central Buildings, Tothill Street, Westminster.

Victor T. Noonan has resigned as safety director of the Industrial Commission of Ohio, which position he has held for several years.

Lieut.-Col. L. J. Campbell, 309th Field Artillery, vice-president Youngstown Sheet & Tube Co., has just returned from France, where he was attached to the First Corps of the First American Army.

Thomas W. Pangborn, president and treasurer Pangborn Corporation, Hagerstown, Md., has been appointed a member of the Maryland Readjustment Committee, which will give aid and counsel in matters applying to manufacturing, finance and transportation. Mr. Pangborn will represent the western part of the State, serving with the following: Governor Emerson C. Harrington; William Ingle, president Baltimore Trust Co.; Holden A. Evans, president Baltimore Dry Dock & Shipbuilding Co.; A. W. Thompson, vice-president B. & O. R. R.; A. C. Bruce, president Bartlett-Hayward Co., and others, totaling 15.

I. J. Schulz, who has been manager of the Cleveland district office of the United Alloy Steel Corporation, Canton, Ohio, has returned to his former position as manager of this corporation's office at Syracuse, N. Y. He has been succeeded in Cleveland by Frederick W. Krebs.

E. A. S. Clarke, president Consolidated Steel Corporation, New York, the new export enterprise of various independent steel companies, sails for England on the Adriatic this week.

Allan A. Templeton, president Detroit Seamless Steel Tubes Co., has been elected president of the Detroit Board of Commerce, an organization of 5500 business and professional men.

Lieut.-Col. Guy A. Wainwright, vice-president Diamond Chain & Mfg. Co., Indianapolis, has received the croix de guerre with palm for bravery. He is cited for being exceedingly cool on every occasion of bombardment with exceptional indifference to danger. He went overseas as a major in the 150th field artillery, Rainbow division, served with the 17th regiment field artillery, and was transferred to the 328th field artillery, 91st division.

Clark W. Parker, W. D. Collins and W. C. Parker, formerly of the Parker Rust Proof Co., Detroit, have organized the Parker Axle & Product Corporation in New York to manufacture the Parker silent internal gear axle.

The Chicago Pneumatic Tool Co. has announced the appointment of J. I. Edwards as manager of its rock drill sales division, succeeding E. Eklund, who has been appointed special foreign representative and will leave shortly for Europe. Fred H. Waldron, formerly Minneapolis representative of the company, has been appointed manager pneumatic tool sales division succeeding J. G. Osgood, resigned. Mr. Waldron's offices are now at the company's headquarters in the Fisher Building, Chicago.

Herman H. Huemme has been oppointed purchasing agent of the Firth-Sterling Steel Co., McKeesport, Pa., succeeding Walter G. Scott, who recently resigned to become purchasing agent of the R. D. Nuttall Co., Pittsburgh.

Major F. Marsena Butts and Lieut. Chester C. Butts, sons of F. H. Butts, who is president of the American Iron, Steel and Heavy Hardware Association, have both been discharged from the service and resumed their positions in Butts & Ordway Co., Boston.

G. W. Reynolds of Pittsburgh, president of the Pittsburgh Kentucky Coal Co., has been elected director of the Vulcan Steel Products Co., New York.

A. L. Wurster has accepted the position of sales manager of the die block department of the Sizer Forge Co., Buffalo. He was formerly associated with the Heppenstall Forge & Knife Co., Pittsburgh. For the last four years he has been their Eastern representative

with headquarters in Philadelphia. Mr. Wurster will retain a Philadelphia office in the Bourse Building.

M. H. Felty, formerly affiliated with R. D. Wood & Co., the Camden Iron Works and the Florence Iron Works, as purchasing agent, is now connected with the Hofmann-Sproul Co., Philadelphia. He will purchase and sell scrap iron and steel, and specialties.

A. T. Bloom, mechanical engineer, recently returned to the home office at Worcester, Mass., after a year's absence in Australia for the Morgan Construction Co., sailed last week from New York for London to join Paul B. Morgan, president and treasurer, and Jerome R. George, vice-president of that company.

John C. Wallace, Jr., who resigned several months ago as purchasing agent of the Pacific Coast Steel Co., San Francisco, has opened offices in the Henry W. Oliver Building, Pittsburgh, for the sale of finished iron and steel products, ferro-alloys, brass and copper sheets, rods and tubes.

The American Metal Products Co., Milwaukee, Wis., manufacturer of aluminum bronze-bearing metal and special acid-resisting bronze, has appointed the following district sales managers: Pittsburgh territory—J. S. Morrison, Oliver Building, Pittsburgh; Cleveland territory—Fred J. Michels, Cleveland; Chicago territory—G. B. Perlstein, Chicago; Detroit territory—Charles Kenyon, Penobscot Building, Detroit; New York territory—J. Kronman, 29 Broadway, New York.

R. M. Little, director American Museum of Safety, New York, will address a meeting of foremen at Worcester, Mass., April 3, on "The Foreman's Part in Industrial Accident Prevention." J. F. Tinsley, president Worcester County Safety Council, will preside. The address will be illustrated by motion pictures.

Capt. Thomas F. DuPuy, of the air service, who recently returned to New York and received his discharge from the army, is now special sales representative with J. H. Williams & Co., Brooklyn, N. Y.

R. J. Wean, formerly of the Aetna Foundry & Machine Co., Warren, Ohio, is now connected with the Columbiana Foundry Co., Columbiana, Ohio, and will devote his entire time to the commercial interests of this company in the Ohio Valley district.

Lieut. Wesley Mellow, Second Battalion, 64th Coast Artillery, son of Thomas Mellow, general manager Liberty Foundry Co., St. Louis, returned to his home in St. Louis last week after nine months' service in France.

S. J. Goodkin, who has had 22 years' experience as a machinist and efficiency engineer, has established the Whitehall Engineering & Machine Co., Whitehall, N. Y., to build machinery, particularly for the textile industry.

V. B. Gaffney is now associated in the capacity of sales manager with Herbert Crapster, No. 1 Madison Avenue, New York, distributor of Cummings gasoline locomotives and railway and industrial equipment. Mr. Gaffney was previously superintendent of purchases at United States Nitrate plant No. 4, Ancor (Cincinnati), Ohio.

Lieut. Jack Sullivan has returned from overseas duty with the American Expeditionary Forces in France, received his discharge, and has resumed his duties as vice-president of the Columbiana Foundry Co., Columbiana, Ohio. He will spend all his efforts for the commercial interest of this company.

H. B. Thomson, director of production with the Federal Adding Machine Corporation, New Haven, Conn., leaves that plant, which is now the experimental station, to assist the Colt's Patent Fire Arms Mfg. Co. at Hartford, Conn., in preparing to manufacture the Federal machines.

Lieut. Col. Louis J. Campbell, vice-president Youngstown Sheet & Tube Co., in charge of industrial relations, returned to Youngstown March 16 and will shortly resume his duties with the company. Col. Campbell commanded light artillery at the Argonne Forest. He was under fire for 74 days.

Edwin W. Dodge has been appointed general sales and works manager of the Star Corundum Wheel Co., Detroit.

G. Walter Esau, president Modern Steel Treating Co., Milwaukee, was elected president of the Milwaukee chapter, American Society of Steel Treaters, at the recent annual meeting. The secretary and treasurer is Charles I. Wesley, general manager Wesley Steel Treating Co.

C. H. Billings has been elected president of the Marshall Furnace Co., Marshall, Mich., and F. K. Berry, general manager. Mr. Berry was recently with the A. B. C. Stove Co., Battle Creek, Mich.

The Sullivan Machinery Co., Chicago, announces the appointment of Chester Mott as manager of its branch office at Denver, Col., 837 Equitable Building, succeeding Wallace T. Roberts, recently resigned. Mr. Mott has been associated with this company for several years as sales engineer at its Spokane, Wash. office, and more recently at its Chicago office in charge of the company's interests in Iowa, Northern Illinois and Minnesota.

S. K. Reeves, formerly with the Paul S. Reeves Co., Philadelphia, manufacturer of bearing metals, and later with the Emergency Fleet Corporation in charge of the real estate department under Rear-Admiral Bowles, has been elected secretary of the Cardinal Tube Co., 2217 Chestnut Street, Philadelphia, manufacturer of rivet sets and bridge reamers.

Calvert Townley, assistant to the president Westinghouse Electric & Mfg. Co., read a paper entitled, "Some Possibilities of Steam Railroad Electrification as Affecting Future Policies," before a meeting of the American Institute of Electrical Engineers, at Boston, March 14. He has been asked to address a joint meeting of all the engineers of the New York district March 26, at the Engineering Societies Building, on the subject, "The Engineer and Legislation."

OBITUARY

WILLIAM H. STEINMAN, blast furnace superintendent of the New Jersey Zinc Co., died recently, aged 61. Mr. Steinman was in charge of the spiegel furnaces at Palmerton, Pa., for a number of years. Prior to that time he was general foreman of the blast furnaces of the Pennsylvania Steel Co., at Steelton, Pa., and was also for a time superintendent of the blast furnaces of the Dominion Iron & Steel Co., Sydney, Nova Scotia.

ROBERT G. SCOTT, for many years with the American Sheet & Tin Plate Co., died at his home in Pittsburgh recently. He was 66 years old and was born in Pittsburgh. He became chief clerk for the Apollo Iron & Steel Co., Apollo, Pa., and remained with that concern until the American Sheet & Tin Plate Co. was organized, where he held a similar position until his death.

CHRISTIAN ALBERT GERLINGER, secretary-treasurer Gerlinger Steel Castings Co., and treasurer Gerlinger Electric Steel Foundry Co., Milwaukee, Wis., died March 10, at the age of 47. He was prostrated by overwork several weeks ago, as the result of assiduous application to duty on war work during previous months.

DANIEL E. HUNT, Worcester, Mass., for many years manager of the Cleveland Machine Co., and later connected with the Rice, Barton & Fales Co., died at his home in that city, 11 Wyman Street, March 3, at the age of 56 years.

JOSEPH B. JARDINE, founder of the Atlas Iron Works, San Francisco, and also of the Jardine Machinery Co., died last week at the age of 72 years. He came to California from Scotland 50 years ago.

MALCOLM GIFFORD, president Gifford-Wood Co., Hudson, N. Y., manufacturers of ice machinery, tools, etc., died March 5.

CHARLES E. PATTERSON, manager Automatic Sprinkler Co. of America, died at his home in Maplewood, N. J., March 10. He was born in Ohio 62 years ago.

ADVANCING STEEL COSTS

Labor in Republic Company's Total Put at $27.30 per Ton

The following, taken from the *Wall Street Journal* of March 18, shows from reports of the Republic Iron & Steel Co. how marked have been the increases in labor cost in the past four years, and the hardship to all steel companies involved in price reductions unaccompanied by readjustments in wages:

"The Industrial Board, which is advocating a drastic cut in steel prices without a corresponding reduction of wages, will find food for reflection in a study of the labor returns of Republic Iron & Steel Co. over the last four years.

"In 1915 Republic Iron & Steel produced 1,033,400 tons of finished steel for sale, and paid out in wages $8,558,574. Average number employed was 11,105.

"In 1918 Republic Steel produced 1,024,000 tons of finished steel and paid in wages $23,742,260. Average number of men employed that year was 14,668.

"The average wage per ton of steel produced in 1915 was $8.30, compared with $23.20 in 1918, a gain of $14.90. In other words, cost of production per ton of steel rose $14.90 in four years. The average wage per man in 1915 was $771, compared with $979 in 1916; $1,211 in 1917 and $1,619 in 1918. It will be observed that wages have more than doubled in the period mentioned.

"As the principal advances in labor rates were made in the latter half of 1918, current earnings per man are not fully reflected in the above tabulation. The average per man per year, at labor rates prevailing Dec. 31, would be materially higher than the amount stated. Three advances in wage schedules were made during the year; 15 per cent April 16, 10 per cent Aug. 1 and approximately 14 per cent Oct. 1, the last advance recognizing the 8-hr. day, with time and a half for overtime; the present basis for employment being 42c. an hour, with 21c. an hour additional for overtime, for common labor.

"Assuming that the average wage per man at present is $1,900, the total Republic Iron & Steel Co. would pay to 14,668 men for a 12-month period would be $27,969,200. Based on Republic's production of finished steel in 1918, this would mean that the labor cost alone would be $27.30 a ton. Yet certain members of the Industrial Board have been advocating $25 pig iron and a corresponding cut in finished steel prices.

"As the labor cost alone in the case of Republic Steel on the foregoing basis is $27.30, it can be assumed that total cost of finished steel production in the case of many independent companies is between $40 and $50 a ton. One large pig-iron producer in the North says his pig-iron cost is between $25 and $30 a ton. Steel and iron costs fluctuate with production. It is well known that with present reduced operations, cost of producing steel is higher than it has been at any time since the war in Europe was declared.

"If the proposed drastic reductions in steel prices are put into effect, there will be little if any profit for high-cost steel producers, even if they receive sufficient orders to operate their mills to capacity. Their earnings will be only a shadow of what they were even in pre-war years, and taxes they will pay in 1919 will amount to practically nothing.

"Republic Iron & Steel is one of the lowest-cost producers in the country, but an analysis of its statement indicates that earnings would be very small if a drastic reduction in steel prices were put into effect without a corresponding reduction of wages. Certain high-cost producers would be forced to operate at a loss.

"That the war has demoralized the efficiency of labor is evident from the fact that it required 14,900 men to produce a smaller amount of steel in 1918 than in the case of 1915, when the average number of employees was 11,105.

"That labor is being well treated by Republic Iron & Steel Co. is indicated by the fact that employees in 1918 received a total of $23,742,260; bondholders, $738,182, and stockholders $3,381,460 in dividends, while the amount carried to surplus was $4,410,473."

Conditions in the Northwest Are Improving

PORTLAND, ORE., March 17.—Industrial and commercial conditions throughout the Northwest appear to be clearing up and a revival of business is expected shortly. The strike of the 40,000 shipyard workers of Seattle, Tacoma and Aberdeen was formally declared off on March 9, after canvass of the votes of the men recently taken. The yards reopened March 11 and no further trouble is looked for for the present. If amicable agreement can be reached regarding the scale of wages to succeed the Macy scale, it is believed business will quickly recover the ground lost in the strike. A peculiar condition following the settlement of the strike is that both sides are claiming victory, the employers because the men went back to work under conditions and wages prevailing before the strike, and the men because they tied up all business for a couple of days with the general strike, which, they say, was for the purpose of a "warning" to capital and not a strike in which they expected to win their demands.

The slowing down of wooden shipbuilding in Portland is allowing more time for the completion of vessels on the ways. Hulls launched at present are much further advanced than those launched during the time of rush work. The Grant Smith-Porter Ship Co., Portland, launched the hull *Alector* on March 6 with everything in readiness for installing her machinery. This leaves only four hulls in the eight building berths at present.

Portland shipbuilders have received information that the shipbuilding plants of British Columbia will close down unless aid is given in the form of bonuses by the Government of the Dominion of Canada. The yards in British Columbia find it impossible to build in competition with the Atlantic Coast or British yards. The shipbuilders feel that if they can receive bonuses for a few years the handicap under which they work will gradually vanish.

To Make Commercial Bribery Criminal

The National Association of Purchasing Agents, 25 Beaver Street, New York, is supporting the bill now pending in the United States Senate intending to make both the giver and the recipient of a commercial bribe guilty of a criminal offense. The legislative committee of the association has formulated a resolution indorsing the proposed legislation, and has requested the Federal Trade Commission to furnish the committee with information concerning the recipients of gratuities in all cases where concerns are cited to appear before that body for practicing commercial bribery. It has also been recommended to the board of directors of the National Association of Purchasing Agents that the acceptance of gratuities intended to influence business should act to prevent such recipient from being accepted or retained as a member of its body.

More Inventions Needed

A new era of inventions is necessary to make up for the world-wide reduction in working hours, declared W. A. Layman, president of the Wagner Electric Mfg. Co., St. Louis, in a recent address on "The Business Situation and its Outlook" delivered before the St. Louis Electrical Board of Trade.

"The whole world has decided to work fewer hours," Mr. Layman said. "This means an immediate increase in the cost of labor and will mean an added cost in production of from 15 to 25 per cent. The only way in which the manufacturer will be able to sell his products at the former low price will be through the aid of inventions."

Government Seizes Metal Products Co. Plant

Last week Government officials seized the plant of the Metal Products Co. at Beaver, Pa., and are still in charge of it. A dispute has arisen between the company and the Government over certain contracts for shells the company was making for the Government, the contracts not having been completed at the time the armistice was signed.

Responsibility for Prices on Steel Committee

Industrial Board's Undertaking Is Not so Much Price-Cutting as Convincing the Public That the Basis Fixed Will Be Stable

WASHINGTON, March 18.—The new Industries Board of the Department of Commerce has oiled up its machinery for to-morrow's meeting with a special committee of the American Iron and Steel Institute. Chairman George N. Peek of the board, however, declares that the entire program will be left to the steel men themselves. It will be up to them to suggest a possible price schedule as well as the basis on which the more itemized details of such a list are to be framed.

It is expected that Judge E. H. Gary and his committee will come armed with at least a tentative schedule of some of the more basic prices to be recommended to the board as "fair." The meeting is to be limited to the members of the steel committee and the members of the Industries Board. No other Government experts are to be called in. The board, apparently, does not plan to submit any data to the representatives of the iron and steel industry, since the latter are likely to have much more up-to-date information than any Government agency can claim.

It is also planned to have the entire matter threshed out by the steel committee and the whole board rather than to submit the question to a sub-committee. The meetings probably will take all of Wednesday and part of Thursday if necessary.

Assistant Counsellor Quigley of the Department of Commerce will participate in the meeting to guide the discussion away from any possible conflict with the Sherman and Clayton anti-trust laws. Members of the board point out that this is the important item in the prospect of effective negotiations. Had the steel men themselves planned to get together on a general price-fixing program—even of reductions—there would have been a certainty of Governmental prohibition. Now, apparently, the industry can count on Administration sanction, which would seem to be equivalent to immunity.

The members of the Industrial Board are considerably annoyed over the insistent newspaper references to their enterprise as one of price-cutting. While it is expected that the new prices will be lower than the old schedule, the fear has been expressed that they will not be enough lower to arouse a general conviction that they have reached the bottom. It is explained that the chief purpose of the entire proceeding is not so much to reduce prices as to convince the public that they have been reduced to a basis that will be stable. A general expectation of radical cuts can thwart the whole board program. So far, however, no one connected with the board or with the Department of Commerce, which is fostering the institution, has hit upon a scheme by which public sentiment can be convinced that the board's prices will be final and will represent the lowest level to which prices may be expected to go.

Chairman Peek has announced the following subdivision of industries among the members of the board:

Thomas K. Glenn, president Atlantic Steel Co., Atlanta, Ga.—Metals.

William M. Ritter of West Virginia, president W. M. Ritter Lumber Co., formerly division chief and assistant to the Commissioner of Finished Products, War Industries Board—Other raw materials.

George R. James, president Wm. R. Moore Dry Goods Co., Memphis, Tenn., formerly chief of Cotton and Cotton Linters' Section, War Industries Board—Textiles and foods.

Samuel P. Bush, president Buckeye Steel Casting Co., Columbus, Ohio, formerly Director of Facilities Division and Chief of Forgings, Guns, Small Arms and Ammunition Section, War Industries Board—Other manufactured articles.

Anthony Caminetti, Commissioner General of Immigration, Department of Labor, Washington, D. C.—Labor.

Thomas C. Powell, Director Capital Expenditures, United States Railroad Administration, formerly representative of Railroad Administration on War Industries Board, and formerly vice-president Southern Railway Co., Cincinnati—Railroad Administration and other Government purchasing agencies.

The board has determined to leave it to the various industries to decide whether their war service committees should undertake to co-operate with the new board or whether new committees should be formed. After the steel men have been heard it is expected that the lumber interests will appear in Washington this week for a preliminary conference. The brick industry has also formed a committee for that purpose. So far the cement industry has not formed its committee.

O. F. S.

Good Showing of Donner Steel Co.

In spite of "unavoidable interference on account of construction work, shortage of materials, quality of gas, coal and coke, and the scarcity and shifting of labor," the total net earnings of the Donner Steel Co., Inc., Buffalo, were nearly as high in 1918 as the year before, the figures showing the comparison being $2,539,580 and $2,631,706 respectively. For 1916 the total was $1,166,058. The past year the net income was $1,123,182 and the amount carried to surplus $965,682, making a total surplus Dec. 31, 1918, of $2,573,547.

The principal improvements put into operation in 1918 consist of: Mold yard; two 600-ton hot-metal mixers; one additional open-hearth furnace; open-hearth office building; additional soaking pits; one 6000-k.w. turbo generator; 18-in. continuous billet mill; 14-in. continuous merchant mill; boiler and blacksmith shop; carpenter shop; addition to warehouse; storehouse, oil house; physical and chemical laboratory. The ore dock has been practically completed, and the old ore bridge was enlarged to allow its use in addition to the new Brown bridges, in unloading ore from vessels; three open-hearth furnaces were remodeled and waste heat boilers installed for all of the open-hearth furnaces. The principal items under construction and installation are two blowing engines and two merchant mills.

The president comments as follows: "It is not probable that we will ever again see pre-war prices; neither is it desirable that wages should ever be as low as they have been in times past. The continued heavy demand for steel during the past three years was naturally expected to result in an enormous expansion in the industry. However, the delays encountered in completing improvements begun in 1915 and 1916, coupled with extreme high prices later prevailing, and inability to secure prompt deliveries, discouraged many additions and improvements that would otherwise have been undertaken. It is doubtful whether the increase in capacity has been larger than might have occurred under normal conditions."

The three prime requisites to obtaining greater recognition for the enginering profession may be stated as follows, according to W. W. K. Sparrow, chief engineer Chicago, Milwaukee & St. Paul Railroad, in speaking before the American Association of Engineers: 1, organization; 2, licensing; 3, broader education, interest and activity in other than purely technical matters.

FINDING EMPLOYMENT

War Department Endeavoring to Obtain Work for Soldiers

WASHINGTON, March 18.—Refusal by President Wilson to devote any of the small remainder of White House funds to rescue the bankrupt United States Employment Service has resulted in turning most of the task of finding employment for demobilized soldiers to the War Department, which in turn is asking the co-operation of the chambers of commerce and manufacturers' associations throughout the United States.

The civilian employment work will be carried out by State and municipal organizations, aided by a skeleton organization of the Employment Service of the Department of Labor, by which the federal authorities hope to keep enough of their machinery intact to be ready to start anew, in case the coming special session of Congress should prove more generous than its predecessor.

In the meantime, the figures which have been given out by the Employment Service fail to show the slightest sign of improvement in general employment—or unemployment—conditions. The slight decrease in unemployment during the preceding week, which resulted from the arbitrary diminution of the figures for Cleveland, disappeared last week, and the figures are on the upward trend again. The surplus of labor reported by 84 cities was 373,038 against 356,566 in 77 cities in the previous week. Only eight cities showed a shortage of labor, and 30 were credited with a demand for labor equal to the supply. These, however, included Chicago and New York, from both of which other reports revealed far more pessimistic conditions. Next to Cleveland—which still reported 60,000—the worst report came from Detroit, with a surplus of 23,000. Then came Buffalo, with 20,000; Pittsburgh, 17,500, and Milwaukee, 14,400.

Strikes and Threats

To make matters worse, there were strikes and threats of strikes in a long list of industrial centers. The worst of these were the harbor strike in New York and the traction strike in northern New Jersey, which seriously complicated the situation in both these centers. The general unrest, however, pervaded all sections, and the Department of Labor officials offered little hope that conditions would presently be stabilized.

Adjustments, however, were reported by conciliators of the department in the controversies involving sheet metal workers, electrical workers and painters in Atlantic City, N. J., and employees of the Milwaukee Bridge Co. and the Worden-Allen Co. of Milwaukee.

Efforts of the new Industrial Board of the Department of Commerce to stabilize price conditions by working out a schedule of lower prices with the representatives of the steel industry, have been complicated by an official announcement of the Information and Education Service of the Department of Labor proclaiming:

Talk About Prices

"The general impression that somehow prices of material and labor are due for a drop within a relatively short time, has been one of the most stagnating features of business life. It is because this feeling was generally current that billions of dollars' worth of work has been held up throughout the country, private and public. It is not that men were anxious to dodge their responsibilities, but they had the natural feeling that if prices were to drop they did not see why they should adventure in advance of that drop on large undertakings."

American Sheet & Tin Plate Co. Denies Charges

WASHINGTON, March 18.—The American Sheet & Tin Plate Co. has filed an answer formally denying all the charges of price discrimination and other violations of the Clayton law made against it by the Federal Trade Commission. Although the latter has set April 2 for a hearing, there is little likelihood that it will be disposed of at that time because of the congestion of the commission docket.

NEVILLE ISLAND PLANS

Interesting Facts Disclosed—Adjusting Claims Under Validation Law

WASHINGTON, March 18.—The abandonment of the Neville Island ordnance project has brought out the interesting fact that less than $6,000,000 has actually been expended upon the plant out of the $140,000,000 originally appropriated. Obligations, however, have been incurred for an additional $6,000,000. As a result the salvage of this project should not be difficult. The actual plant construction has made, apparently, but little progress, for the buildings completed are to be razed as soon as they no longer are needed for storage purposes. Most of the obligations incurred are for equipment and tools, many of which are being completed for transfer to other ordnance projects and arsenals. Had the original program been carried out, it would have taken two years to complete the Neville Island plant. So far the various ordnance officials have not decided how long they will use the unfinished buildings for storage sheds. To a considerable extent this depends on the military program to be agreed upon at the summer special session of Congress.

Adjusting Claims Quickly

The War Department reports speedy progress in the adjustment of claims under the contract validation law. This is the result of the fact that the machinery for this work was ready to begin work as soon as President Wilson signed the bill. No data, however, are available as to the totals of the claims which have been paid.

Under the terms of the contract validation law, Secretary Lane of the Interior Department has appointed former Senator J. F. Shafroth of Colorado, Philip M. Moore, St. Louis, and former Representative M. D. Foster of Illinois, members of the commission that will have charge of the payment of the losses incurred by mining men in the production of manganese, chrome, pyrites and tungsten for war purposes. These claims are the result of the fact that during the war the Interior Department, the Emergency Fleet Corporation and the War Industries, War Trade and Shipping boards urged the mining men to produce these materials to supply war necessities. When the armistice came these producers found no peace-time market for much of their stocks. In the contract validation bill Congress set aside $8,500,000 to meet claims for these losses. These must be billed within three months after the passage of the act. The law states that the claims must have been incurred between April 6, 1917, when the United States went to war, and Nov. 12, 1918, when the armistice was signed. The Secretary of the Interior is charged in the act with taking into consideration and charging to the claimant the market value of the minerals on hand Nov. 12, 1918, and also the salvage or usable value of the machinery that was installed to produce these war minerals.

Mr. Moore is a former president of the American Institute of Mining Engineers and a well-known engineer. Mr. Shafroth was a member of the Senate Committee on Mines and Mining of the Sixty-fifth Congress and Mr. Foster was chairman of the House Committee on Mines and Mining.

Walker D. Hines, director general of railroads, announced the appointment of Henry B. Spencer as director of the Division of Purchases, effective March 15. The Division of Purchases is a new division, having been formerly a part of the Division of Finance and Purchases, which has been separated into two divisions as the result of the resignation of John Skelton Williams. Swager Sherley has accepted the appointment as director of the Division of Finance. Mr. Spencer has been connected with the Southern Railway System since 1897. He has now resigned its vice-presidency.

After being closed as a result of a strike for two months, the Waynesboro, Pa., branch of the Emerson-Brantingham Co., farm machinery manufacturer, has again resumed operation. Slightly less than 100 employees are affected.

SHORT TRADE ITEMS

The International Oxygen Co., Newark, N. J., has opened offices in the First National Bank Building, Pittsburgh, in charge of R. A. Cornwall. Philip Wesley, formerly Pittsburgh representative of the company, has been placed in charge of the Chicago sales office in the Railway Exchange Building. The British branch of the company, known as the Integral Oxygen Co., Ltd., has commenced the manufacture of electrolytic cells and other products for the British market. E. L. W. Byrne is the general manager in charge, with offices at 38 Victoria Street, London, S. W.

The Cleveland Duplex Machinery Co., Cleveland, dealer in new and used machinery, has been incorporated with a capital stock of $20,000, succeeding the partnership that was conducted under the name of the Duplex Machinery Co. G. J. Hawkey is president, and Richard Goedecke is vice-president and sales manager, succeeding W. C. Werley in the latter capacity. T. D. Britton, who has been an ensign in the Navy located at the Navy Steam Engineering School, Hoboken, N. J., has become associated with the company, which has offices and salesrooms at 1224 West Sixth Street.

The New Standard Hardware Works, Mount Joy, Pa., manufacturers of a new process for the hot tinning and retinning of all kinds of metals, has closed a contract for a No. 2 unit which will be installed at Sturges & Burns Mfg. Co. plant at Chicago. During the past two months plants were installed and completed at the Buhl Stamping Co., Detroit.; and also the National Enameling & Stamping Co., Milwaukee, Wis. Both units are used for hot tinning steel stampings for milk cans.

The Miami Trailer Co., Troy, Ohio, has recently purchased another plant, which will increase its former capacity in the manufacture of trailers about four times. The new factory has a floor space of about 50,000 sq. ft. This company has plans for the building of about 7000 light trailers this year.

The Dearborn Chemical Co., Chicago, has just opened an office in Kansas City, Mo., at 206 Commerce Trust Building, on Walnut Street between Ninth and Tenth. G. M. Massen and W. H. Fairlamb, company representatives in the territory adjacent to Kansas City, will both make their headquarters at the new office.

The Canton Art Metal Co., Canton, Ohio, is planning an extension to its export business, and W. W. Clark, vice-president of the company, will leave for New York shortly to take charge of the company's offices in that city.

George Komorowski, an engineer now at Ugine, Savoie, France, would like to correspond with American makers of machinery, factory supplies and hardware for shipment to Poland under an exclusive sales agency agreement.

A. L. Anderson & Brothers, Inc., Altoona, Pa., railroad contractors, have received a contract from the Cambria & Indiana Railroad Co. for the construction of a three-mile line. Work is scheduled to start about March 15.

Arthur G. McKee & Co., engineers, Cleveland, who recently took a contract for two blast furnaces for the India Iron & Steel Co., Calcutta, have placed a contract with the W. B. Pollock Co., Pittsburgh, for the fabricated plate and structural work for one of the furnaces, including the stoves. The plates for the straight work in the furnace will be purchased by the firm and shipped to India in flat form.

The National Implement and Vehicle Association, Chicago, has moved from its present quarters at 76 West Monroe Street, into the Commonwealth-Edison Building at 72 West Adams Street.

Freyn, Brassert & Co., Engineers, Chicago, have been retained by the American Rolling Mill Co., blast furnace division, Columbus, Ohio, as consulting engineers for improvements to be made at the company's two Columbus furnaces.

The Kansas City offices of the Morse Engineering Co., western representative of the Morse Chain Co., Ithaca, N. Y., have been moved to Suite 211-212, Finance Building, and are in charge of W. V. Warner, office district manager.

The Black & Decker Mfg. Co., Baltimore, has added a ¼-in. portable electric drill to its standard line made in sizes of 3 1/16 in. to ⅜ in. An illustrated article describing these drills was published in THE IRON AGE, Dec. 26, 1918.

The Moltrup Steel Products Co., Beaver Falls, Pa., manufacturer of cold-drawn, milled and ground specialties, announces the opening of an Eastern sales office in the Woolworth Building, New York, in charge of J. J. Callahan.

The Treadwell Engineering Co., Easton, Pa., has been awarded a contract for a 34-in. two-high reversing blooming mill, with roller tables, manipulator and sheers, complete, by the Automobile Bertilet, Usines Vennissieux, Rhone, France.

The Sullivan Machinery Co. announces the establishment of a branch sales office and warehouse in Mexico, at Edificio Oliver No. 3, Mexico City, Mexico. Joseph F. Bennett, for a number of years sales engineer in Mexico, associated with the El Paso branch of this company, has been placed in charge of the Mexico City office.

The Pittsburgh section of the Association of Iron and Steel Electrical Engineers will hold a meeting April 19 at the Chatham Hotel, at which Lieut. A. M. McCutcheon, U. S. N., will present a paper on "The Electricity Afloat; Steel Mill Practice as Employed in the Navy."

The Roberts Portable Oven Co., Chicago, Ill., will move April 1 into new offices at 853-857 West North Avenue, from its present location at 853 West North Avenue.

The two-story factory of the Eureka Bending Co., York, Pa., abandoned two years ago, has been purchased for $14,000 by the Luria Iron & Steel Co., a newly organized company.

The March-Brownback Stove Co., Pottstown, Pa., has broken ground for the erection of a 50 x 100 feet addition. The company has a large contract for stoves for the navy.

During the past few weeks the Rockaway Rolling Mill, Rockaway, N. J., manufacturer of bar iron, has been operating its plant on a three-day week schedule. It is said that plans are under way to increase this schedule at an early date.

The Onondaga Steel Co., Syracuse, N. Y., reports that a shipment of high-speed steel scrap has been sent to it from Japan for conversion into high-speed steel bars.

The Electrical Alloy Co. has removed its offices from 165 Broadway, New York, to its plant at Morristown, N. J.

Machinery Markets and News of the Works

PRICES ARE COMING DOWN

Planer Manufacturers Reduce 20 Per Cent

Other Price Concessions Being Granted to Close Business—Flood of Second-Hand Tools in East

Prices of machine tools are making progress toward a peace basis. Manufacturers of planers have announced a 20 per cent reduction, and it is predicted in the trade that builders of other types of tools may soon formally revise their quotations. In some instances where formal quotations have not been lowered, price concessions are being made in one way or another to close business. Prices on overhead electric cranes have dropped from 20 to 33 1/3 per cent since the war ended, with an occasional extreme reduction of about 50 per cent being reported. Locomotive cranes have declined about 15 to 25 per cent. A 20-ton locomotive crane which cost about $23,000 last fall can now be obtained for about $18,000.

The New York machine-tool market has been somewhat disturbed by large offerings of new and second-hand tools by war plants. The International Arms & Fuze Co., Bloomfield, N. J., has issued a list of about 1000 tools which are being offered for sale. The New York Air Brake Co., Watertown, N. Y., and the H. H. Franklin Mfg. Co., Syracuse, N. Y., have also issued lists, and in the latter case many of the tools are new, never having been uncrated. They were bought recently from the War Department at 60 per cent of their original cost. The Franklin company selected those it required for its own shops and will dispose of the remainder.

There has been a moderate amount of buying in the New York market during the past week, but the business is spotty in that some concerns have had a fairly good week, while others have done little or nothing. Among those companies which have come into the market for tools are the Crucible Steel Co. of America, the E. W. Bliss Co., the New Jersey Zinc Co. and the F. L. Smythe Machine Co. The Navy Department is asking for bids on about 50 tools for the Norfolk Navy Yard. A Swiss company making knitting machinery may erect a plant in this country and has asked for quotations on 100 or more tools, including lathes, milling machines, shapers, grinders, etc.

A canvass of the machine-tool situation among the 48 plants in the Cincinnati district reveals that 14 declare that present business is "fair," seven say it is "good," three call it "excellent," two describe it as "normal," eight say it is "quiet," and 14 say it is "poor." Half of the plants say they are employing a normal number of workmen, four say the number employed is above normal, and the remaining 20 report the number below normal.

New York

NEW YORK, March 18.

A flood of new and second-hand machine tools from war plants threatens to disturb the New York machinery market, about 1000 tools in one list having been offered by the International Arms & Fuze Co., Bloomfield, N. J., with more to be put on the market later. Many of these tools are said to be nearly as good as new, and include large numbers of drills, hand screw machines, turret lathes and other small and medium-sized tools, which were used for making shells and fuses and other munitions. The H. H. Franklin Mfg. Co., Syracuse, N. Y., has a list of 100 or more tools, mostly new, which are being offered for sale. Some of these were recently purchased from the War Department at 60 per cent of their original invoice price. The Franklin company selected what it required for its own shops and will dispose of the rest. The New York Air Brake Co., Watertown, N. Y., also is trying to dispose of a large list of tools used for the manufacture of gun mounts.

The New York Air Brake Co. has announced that it will build motor trucks at its Watertown plant, but a considerable part of its present equipment will be made available for this work. The plant of the International Arms & Fuze Co. is to be used for some kind of peace work which has not yet been made known, but which the machine-tool trade believes will be automobile parts. When the equipment being offered for sale is disposed of, it is probable that new tools will be needed for whatever work is undertaken.

One of the principal buyers of tools during the past week was the Crucible Steel Co. of America, whose appropriation for this purpose was $125,000. The new tools are required for the machining of forgings. The forging capacity at the company's Atha works, Harrison, N. J., was considerably increased during the war, and the company will now turn to commercial forging work.

A large inquiry is before the trade for a complete manufacturing plant which may be built in the East by a Swiss concern which now has a plant in Switzerland and another in France for making knitting machinery. The French plant may be duplicated in this country. The list on which quotations are being obtained includes lathes, milling machines, shapers, grinders, etc., more than 100 tools being specified.

The Bureau of Supplies and Accounts, Navy Department, has asked for quotations on specification No. 3800, which covers a list of tools for the Navy Yard at Norfolk, Va. In the list are 21 radial drills, ten 24-in. drilling machines, 2 heavy-duty turret lathes, five 21-in. turret lathes, three 24-in. turret lathes, four 36-in. heavy-duty engine lathes, triple gear, all motor-driven. Bids will be opened at Washington on March 25.

The E. W. Bliss Co., Brooklyn, is getting quotations on a list of tools, including six boring mills and a number of planers. The New Jersey Zinc Co., New York, will buy several new tools. The F. L. Schmidt Co., Eleventh Avenue and Twenty-first Street, New York, manufacturer of envelope machinery, is buying a small list of new equipment. This company has changed its name to the F. L. Smythe Machine Co.

Prices of machine tools are making more progress toward a peace basis. While formal quotations are in a great many instances not being lowered, concessions of various kinds are being made when necessary to close business. Manufacturers of planers have announced a 20 per cent reduction. As prices of many machine tools have been guaranteed against decline until April 1 or July 1, those who have bought tools will receive rebates from the builders. Opinion in the trade seems to confirm the belief that many prospective buyers have held that many prices are due for an early reduction. The prospect that lower prices on pig iron and steel will soon become effective seems to strengthen this expectation.

Builders of overhead electric cranes and locomotive cranes have reduced prices considerably since the ending of the war. An extreme instance is cited of a buyer duplicating a crane bought during the war period at about one-half of its cost at that time. The average reduction is

said in the trade to vary from 20 to 33 1/3 per cent. On locomotive cranes the reductions vary from 15 to 25 per cent. A 20-ton locomotive crane can be bought to-day for $4,000 to $5,000 less than was obtained during the latter few months of the war.

There are quite a few small inquiries for overhead electric cranes in the market, but very little business is being closed. Prospective buyers receive quotations and then in a majority of cases decide to postpone purchasing. Agustin Fuller & Co., sugar machinery exporters, 25 Beaver Street, New York, have inquired for a 20-ton crane for export to Cuba. The Philadelphia & Reading Railroad has an inquiry out for a grab bucket crane. The United States Lighthouse Service wants a 10-ft. crane, 28-ft. span, for a plate shop at Tompkinsville, Staten Island. The West Virginia Pulp & Paper Co., Fifth Avenue Building, New York, is inquiring for a 3-ton gantry crane.

The Newhall Chain Forge & Iron Co., 90 West Street, New York, recently completed and placed in operation a section of its new shop at Garwood, N. J., for the production of hand-welded dredge, crane, steam shovel and foundry sling chains, special forgings, etc. This, with its Garwood factory that has been in operation for some years, will enable it to take care of a greater line of special forging work, both in connection with and independent of its regular line of chains.

The Cossey Shipyard, foot of Henry Street, Tottenville, Staten Island, operated by Harry Cossey, has completed the first section of the 10,000-ton drydock at the plant for the Todd Shipbuilding Corporation, Brooklyn. It will be built in eight sections, each 90 ft. long x 114 ft. wide x 45 ft. high.

Charles H. Bennett, Jr., Newark, N. J., has purchased property, 100 x 181, at Front Street and Saybrook Place, as site for an automobile repair works.

The Empire Fixture Co., Newark, N. J., has filed notice of organization to manufacture metal display fixtures, etc. Edward Siegel, 62 Napoleon Street, and Edward J. Ridgeon head the company.

The Chemical Machinery Experiment Co., Mahwah, N. J., has been incorporated with a capital of $20,000 by J. J. Serrill, Robert Smith and A. L. D. Moore, to manufacture special machinery.

The Battery & Electric Service, Newark, N. J., has been incorporated with a capital stock of $25,000 by C. Alexander Lion, to manufacture electric storage batteries.

The Recter Electric Co., New York, has been incorporated with a capital of $10,000 by W. Claman, A. Goetz, and F. W. Martin, 320 East 156th Street, to manufacture electrical products.

The Fostar-Roskam Co., Inc., New York, has been incorporated with a capital of $30,000 by E. I. Roskam, 111th Street and Broadway, P. Ross and H. Sancier, 1834 Broadway, to manufacture motors, automobile parts, etc.

The Electric Vacuum Cleaner Co., New York, has been incorporated with a capital of $50,000 by G. E. Patterson, J. Sherwin and A. K. Baylor, 120 Broadway, to manufacture vacuum cleaning appartus.

Joseph F. Cullman has rented to Charles T. Stork & Co., Inc., exporters and importers, the seven-story building at 133-137 Front Street, New York, occupying the entire block front between Pine and Depeyster streets.

The W. & A. Fletcher Co., Hudson Street, Hoboken, N. J., has plans under way for a one-story plate shop, 50 x 150 ft.

The Dover Boiler Works, Dover, N. J., is planning the installation of electric welding equipment at its local plant.

The Keystone Garage Co., 82 Stegman Street, Jersey City, N. J., is considering the erection of a new motor car works at Communipaw Avenue and Bergen Street, to cost over $50,000.

The International Auto Equipment Co., Newark, N. J., has been incorporated with a capital of $10,000 by William H. Reibold and George Reibold, Newark, and Ernest Trautmann, Lafayette Street, Elizabeth, to manufacture automobile parts, etc.

The Non-Metallic Flux & Crucible Co., Newark, N. J., has filed notice of organization to operate at 26 Hennessy Street, to manufacture crucibles, etc. Thomas F. Durning, 200 Van Buren Street, heads the company.

The General Electric Co., Schenectady, N. Y., is said to be planning for a one-story addition to its plant at Ampere, N. J., 94 x 100 ft., to cost $35,000.

Metz Brothers, James Avenue, Jersey City, N. J., manufacturers of fireproof doors, will build a one-story addition 40 x 48 ft.

The Donmor Co., New York, has been incorporated with a capital of $30,000 by R. R. Morse and R. J. Donovan, 136 Ocean Parkway, Brooklyn, and J. C. Foley, Jersey City, N. J., to manufacture hardware and specialties.

The American Zylonite Corporation, New York, has been incorporated with an active capital of $262,500 by A. Burke, M. D. Lugash and C. H. Louis, 1 West Eighty-first Street, to manufacture celluloid products.

The property of the Eisemann Magneto Co., 32 Thirty-third Street, Brooklyn, recently sold by A. Mitchell Palmer, Alien Property Custodian, has been acquired by G. E. Matthies for $907,600.

The Premier & Potter Printing Press Co., New York, has been incorporated with a capital of $500,000 by I. B. Feinberg, H. Church and T. Reis, 51 Chambers Street, to manufacture printing presses.

The Brown-Holmes Co., Brooklyn, has been incorporated with a capital of $50,000 by C. E. Brown, F. & M. V. Holmes, 360 Macon Street, to manufacture motorcycles, parts, etc.

The Maxim Munitions Corporation, 120 Broadway, New York, has filed notice of change in name to the Maxim Corporation, increasing its capital from $10,000,000 to $12,000,000.

The American Gas Machine Co., 37 Warren Street, New York, has leased property at 78 Reade Street for a branch establishment.

The Industrial School, 303 East 109th Street, New York, has had plans prepared for a two-story brick shop and automobile service building, 50 x 100 ft., at 418-20 West Forty-first Street, to cost $50,000, including equipment.

The Warren Nash Motor Corporation, 123 West Sixty-fourth Street, New York, has leased 18-20 West Sixty-third Street for a motor car service establishment.

The American Die & Tool Works, 182 Center Street, New York, is arranging for the early erection of its two-story plant, 50 x 90 ft., at Woodhaven, Long Island, estimated to cost $25,000.

The Butterfly Phonograph Motor Corporation, New York, has been incorporated with a capital of $75,000 by M. Samuels, W. and M. Kossman, 1961 East Thirteenth Street.

The High Ground Iron Works, 299 Scholes Street, Brooklyn, has increased its operating capital to $12,000.

The Englander Spring Bed Co., 88 Thirty-fifth Street, Brooklyn, has awarded contract to the Rosenthal Construction Co., 228 Jackson Street, Brooklyn, for its proposed one and two-story reinforced concrete plant on Johnson Avenue, near Stuart Avenue, 20 x 85 ft., and 105 x 200 ft., estimated to cost $150,000.

The United States Electric Mfg. Corporation, New York, has been incorporated with a capital of $50,500 by J. J. Lazaroe, A. Caming and G. Frankel, 666 West 162d Street.

The Rex Metal Products Co., Brooklyn, has been incorporated with a capital of $15,000 by L. E. McCuen, W. L. Bowman and J. J. Hickey, 120 Broadway.

The Radishaw Mfg. Co., New York, has been incorporated with a capital of $250,000 by L. J. Haines, M. Ganya and J. Connors, 80 Broadway, to manufacture telephones, etc.

The United Metal Hose Co., 89 Chambers Street, New York, has increased its capital from $50,000 to $100,000.

The Safety Cover Co., New York, has been incorporated with a capital of $50,000 by S. Alpert, C. W. Abbott and F. A. Kapp, 1463 Broadway, to manufacture foundry equipment and supplies.

The Lasky Motor Car Corporation, 17 Graham Avenue, Brooklyn, has had plans prepared for a two-story brick repair shop and service station, 100 x 100 ft., at Montrose Avenue and Leonard Street.

The Metro Tool & Die Works, 33 Grand Street, New York, has changed its name to the Metro Tool Co., Inc.

The Murcott Steel Products Co., Inc., Brooklyn, has been incorporated with a capital of $50,000 by F. C. Cairns, J. Murcott, Jr., and W. F. A. Watson, 384 Classon Avenue, to manufacture iron and steel specialties.

The Buick Auto Repair Co., 244 West Forty-ninth Street, New York, is planning the immediate erection of a building at 321-43 West Forty-fourth Street, to cost about $400,000. It will be nine stories, about 100 x 200 ft., a large section to be given over for a repair shop and machine works.

The Rapid Fire Proof Door Co., New York, has been incorporated with a capital of $10,000 by M. J. Bagner, A. E. Grunstein and L. Cohen, 178 Brook Avenue, to manufacture metallic doors.

Mullon Bros., Brooklyn, operating iron works at 1 Devoe Street, have incorporated as Mullon Brothers, Inc., with capital of $20,000.

Plans for a cooperage plant to cost $50,000 have been

filed by the Schofield Oil Co., Avenue R and Passaic River, Newark, N. J.

Theodore Bornstein, 522 South Seventeenth Street, Newark, N. J., is having plans prepared for a one-story automobile repair shop and service works, 50 x 200 ft., at 23-25 Central Avenue, to cost $25,000.

The Holdsit Mfg. Co., Hudson Falls, N. Y., has been incorporated with a capital of $200,000 by R. C. Vincent and E. V. Bulow, Hudson Falls, and W. R. Hamm, Simsbury, Conn., to manufacture automobile appliances.

The Cuthbert-Friedberg Mfg. Co., New Brunswick, N. J., has been incorporated with capital of $50,000 by Edgar Cuthbert and Louis Friedberg, New Brunswick, and Joseph Friedberg, Highland Park, to manufacture motor vehicles, etc.

The George F. Briggman Tire & Rubber Co., Metuchen, N. J., has been incorporated with a capital of $250,000 by Edgar L. and V. S. Bates and George F. Briggman.

Buffalo

BUFFALO, March 17.

The Bronzo Alumina Corporation, Tonawanda, N. Y., whose foundry was recently destroyed by fire, is arranging to remove its plant to Buffalo. J. H. Wilting, 327 Johnson Street, Buffalo, is manager.

The Willys-Overland Co. of Toledo has secured option on a tract of land at Sugar and Lockport streets, Niagara Falls, adjoining the new plant of the Republic Carbon Co., on which it is stated it will build an extensive plant for the manufacture of tractor plows.

The H. H. Schultz Mfg. Co., Gowanda, N. Y., is rebuilding its one-story plant, 140 x 200 ft., at a cost of $18,000.

The Liberty Bread Slicer Co. has been incorporated at Rochester with a capital stock of $20,000 to manufacture bread-slicing machines. F. M. Dale, H. T. Lockman and W. C. Knapp are the incorporators.

Plans are being drawn by the Atlantic Stamping Co., Rochester, for an addition.

The Central Flatiron Mfg. Co., Johnson City, N. Y., has completed plans for a plant addition.

John Kling, furniture manufacturer, Mayville, N. Y., is completing plans for a plant, 64 x 540 ft., one story, to be erected at Westfield, N. Y.

The Geneva Cutlery Co. is having plans drawn for an addition to its factory at Torrey Park, Geneva. M. Page is president.

The Niagara, Lockport & Ontario Power Co., Marine Bank Building, Buffalo, operating an interurban electric light and power system, has arranged for a bond issue of $1,980,000 in part for extensions in its electric power plant and system. Fred D. Corey is president.

The Curtiss Aeroplane & Motor Corporation, Buffalo, is operating its Churchill Street plant at the present time for the production of 60 K twelve and six-cylinder motors for the Government, this being the type of motor which recently broke speed records. At the North Elmwood Street plant the company has recently completed an order for 763 type H.S. flying boats, and is now operating this plant for the production of 60 flying boats of the F-5 type. The working force at the Churchill Street plant was recently reduced by the releasing of about 150 operatives.

The Horse Auto Trailer Corporation, Buffalo, has been incorporated in Delaware with a capital of $250,000 by M. E. Hillis, George S. Beebe and W. P. White, Buffalo, to manufacture trailer trucks and truck parts.

The Bancroft-Jones Corporation, Mutual Life Building, Buffalo, recently incorporated with a capital of $200,000, to manufacture fabricated steel building products, is considering plans for a new plant. George C. Jones is manager.

Seyfried & Poulsen, 185 Fox Street, Buffalo, have had plans prepared for a one-story automobile repair shop, 40 x 90 ft., at 933-35 Ellicott Street.

The American Car & Foundry Co., Buffalo, is operating its plant on Babcock Street for the production of a number of cars for foreign service; the works are now giving employment to about 600 men, and will be maintained on this basis. Plans are under consideration for the reopening of the company's works at Depew, N. Y., used during the war for the manufacture of shells. The machinery installed for this purpose is still in place, and it is understood will be remodeled for regular production. When in full operation the Depew works has a force of about 1200 employees.

The Perl W. Devendorf Corporation, Watertown, N. Y., has been incorporated by Perl W. Devendorf, C. B. Winslow and G. E. Wallace, with capital of $150,000, to manufacture motor vehicles and parts.

Multikraft, Inc., Rochester, N. Y., manufacturer of wooden and metallic toys, etc., is arranging for the rebuilding of its plant, one-story, 60 x 170 ft., at Hilton, N. Y., destroyed by fire, with estimated loss of over $50,000. Harrison A. Baldridge is president and secretary.

The Jones & Pimm Co., 308 Otisco Street, Syracuse, N. Y., manufacturer of automobile tops and kindred specialties, has purchased the property of the DeWitt Motor Co. on West Onondaga Street and will occupy it as a new works. Operation is planned in full early in April. J. C. and George A. Pimm head the company.

The Harrison Radiator Corporation, Lockport, N. Y., has acquired under lease a two-story building at Charles and Chestnut streets for an addition for the manufacture of radiator caps, etc. H. C. Harrison is president.

The Weekes-Hoffman Co., Dickerson Street, Syracuse, N. Y., manufacturer of tools and chucks, is arranging for an increase in its capital from $200,000 to $500,000 for general expansion. The company is planning to increase the capacity of its plant by the installation of a new department for the manufacture of gears as well as other parts for automobiles, tractors, etc. It is planned to give employment to over 150 men in the new department, commencing operations early in May.

The Medina Toy Co., Inc., Medina, N. Y., has been incorporated with a capital of $50,000 by W. E. Stocking, W. L. Bennett and W. F. Barry to manufacture mechanical toys.

Philadelphia

PHILADELPHIA, March 17.

Although dealers in machine tools have furnished a fair number of quotations in the past few weeks, comparatively little business is being closed, buyers showing a disposition to hold off for lower prices, which are beginning to materialize on some lines. In some instances, formal quotations have not been lowered, but price concessions are made in one way or another when it comes to the point of closing the business.

Alcorn, Blockhouse & Co., engineers, 1418 Walnut Street, are still getting quotations on a fairly large list of equipment for a railroad shop in Belgium.

The Lutz Co., Inc., Philadelphia, manufacturer of quilting machinery, has bought a small list of tools.

The Tioga Steel & Iron Co., Philadelphia, which will complete a naval gun contract on April 1, has tentative plans for an expansion of its plant to include a steel foundry, with open-hearth furnace, and an addition to the machine shop. Some of the large lathes used for boring and turning gun forgings are being shipped to navy storage depots, and a more general line of machine shop equipment will be required when the company engages in commercial forging work.

The Bethlehem Fabricators, Inc., formerly the Guerber Engineering Co., Bethlehem, Pa., has purchased a number of assembly hoists and may be in the market for plate-working machinery for an expansion of its steel fabricating shop.

The Lansdale Motor Co., Lansdale, Pa., has been incorporated with a capital of $10,000 to manufacture automobiles, etc. Robert M. Hollowell, Lower Gwynedd Township, Pa., is the principal incorporator.

The International Boiler Works, Stroudsburg, Pa., plans to increase its capital stock from $300,000 to $500,000. Attorney-General A. Mitchell Palmer, whose home is at Stroudsburg, is the secretary.

The Mine Service Equipment Co., Scranton, Pa., has been formed to manufacture electrical and mechanical appliances. The capital stock is $20,000. Francis H. Coffin, Scranton, is the principal incorporator.

The York Heating & Ventilating Corporation, York, Pa., capital stock $50,000, has been incorporated to manufacture sheet-metal goods. Frank S. Muzzey, 7320 Bryan Street, Philadelphia, is the principal incorporator.

The March-Brownback Stove Co., Pottstown, Pa., has broken ground for an addition 50 x 100 ft. It has a contract to furnish a large number of stoves to the Navy.

The Joy-Rogers Co. has been organized at Johnstown, Pa., with a capital stock of $30,000 to manufacture general tin and hardware. Joseph H. Joy, Pine and Golde streets, Johnstown, Pa., is the principal incorporator.

Samuel F. Dunkle, president Harrisburg Mfg. & Boiler Co., Harrisburg, Pa., together with two others, has formed the Solotone Mfg. Co., Harrisburg, Pa., with a capital stock of $50,000, to manufacture phonographs and accessories. He is to be treasurer.

The Reading Steel Castings Co., Reading, Pa., is planning to extend its business, and has taken out a permit

for the erection of a new $50,000 machine shop. It will be 78 x 202 ft., of concrete, steel and stucco.

The Fulton Truck Co., Philadelphia, has leased a two-story building at 131-33 South Twenty-fourth Street, for a motor truck service station and repair works.

The Union Petroleum Co., Widener Building, Philadelphia, is considering plans for rebuilding the section of its oil refining plant at Clarendon, Pa., recently destroyed by fire with loss, including boiler equipment, pumping machinery, etc., estimated at $100,000.

The Automatic Safety Guide Co., Philadelphia, has been incorporated in Delaware with capital of $100,000 by F. Hoppe, Richard H. Sharp and James Mayner, to manufacture safety lamp devices for automobiles.

The Camden Machine & Equipment Co., Camden, N. J., has been incorporated with a capital of $50,000 by Wilbur A. Stiles, Clarence G. Wyatt and Thomas B. Stilzler, to manufacture machinery, tools, etc.

The Abram Cox Stove Co., American and Dauphin streets, Philadelphia, is said to be planning the installation of a number of new machine tools.

The Independent Lamp & Wire Co., Albemarle and Elm streets, York, Pa., manufacturer of wire products, will build a one-story addition to cost $6,500.

The Reading Foundry & Supply Co., 242 South Seventh Street, Reading, Pa., will manufacture a new patented interchangeable T pipe joint, invented by George W. Kafer, Trenton, N. J.

New England

BOSTON, March 17.

A Connecticut manufacturer while confident that trade showed continuous but admittedly tardy improvement in his field was frank in confessing that his purchases of raw material were only for current requirements. He was by no means a firm believer that prices on such materials as he used would fall to any further appreciable lower levels, but he deemed that contingency quite enough of a possibility to make him restricted to a purely hand-to-mouth buying program. When this frequent view of market prospects begins to recognize other directions of the commercial compass there will be a decided quickening of the trade pulse. Now there is altogether too common a watchful waiting. A maker of printing machinery at Hartford, Conn., reports a brisk business in the foreign field as well as the domestic trade. His concern suffered during war-times because yoked to what was designated a non-essential business. Nowadays that very business happens to be coming into its own from the former repression here at home in this United States and is also favored by exemption from the limitations of the embargo abroad. He reported actual sales were being made in the United Kingdom as well as in Norway and Sweden. Many inquiries are coming into the various other sales departments and certain lines of machine construction; drop hammers and keyway cutters, for example, are finding a sustained demand. But the placing of orders by the automobile builders has not yet shown the spirit or the scope that it is expected to exhibit later in the year. Building operations have lagged for a time, but during the past week began to speed up, particularly in the western part of New England, and it is expected that when all the returns are tabulated it will be shown that the new construction has gone far beyond what it has been since pre-war seasons.

The Springfield Chamber of Commerce arranged for a conference there on March 13 with E. M. Herr, president Westinghouse Electric & Mfg. Co., regarding the future of that company's plants at East Springfield and Chicopee Falls, Mass., but nothing definite was determined as to what will follow the termination of the war contracts now in progress and closing up. A local committee has been appointed and will investigate the matter as thoroughly as possible. Machine shops doing work for textile plants find some encouragement in the restarting of six mills in Fall River, Mass., after a five-weeks' shutdown. While operating on only a half-time basis, there are about 1500 operatives affected. This relief is all the more welcome because of the sluggish textile conditions in general.

C. O. Johnson & Son have bought two acres for the erection of a wire-drawing factory at Worcester, Mass., one story and basement, 40 x 256 ft., to cost $20,000, frame construction, and to be ready for occupancy early in May.

Contracts placed for additions at plant of the New Departure Mfg. Co., Bristol, Conn., include a one-story brick and steel heat-treating shop, 283 x 103 ft., office and laboratory, two stories, brick and steel, 30 x 103 ft.

Fumes escaping from a naphtha barrel caused an explosion on March 10, killing one man and badly injuring several others, at the plant of the Baldwin Chain & Mfg. Co., Worcester, Mass., and causing a loss of two of the company's buildings of $5,700. Repairs will be made at once.

The Milford Pink Granite Co., Milford, Mass., will soon start on the rebuilding of its plant, including power house and blacksmith shop, 50 x 80 ft.

Bids are being received for the erection of factory additions, one story, 20 x 40 ft., and one story, 40 x 70 ft., at the plant of E. E. Kemp, Somerville, Mass.

Fire repairs to the extent of $25,000 are being made at the plant of the Cochrane Mfg. Co., Malden, Mass.

Two factory buildings are in course of erection for the Athol Mfg. Co., Athol, Mass., foundation work being finished. One building is one story, 30 x 120 ft., and the other is one story, 40 x 60 ft.

Bids are in for a factory addition, one story, 60 x 79 ft., for the Hartford Rubber Co., Hartford, Conn.

Landers, Frary & Clark, New Britain, Conn., will put up a factory building, four stories, 60 x 162 ft., and a power house, 42 x 42 ft. at Plainville, Conn., for which figures have been invited.

The Providence Body Co., Providence, R. I., has made the plans and will soon commence the building of a one-story brick factory, 60 x 300 ft.

The brick factory building, $50,000, for the N. E. Iron Works, New Haven, Conn., is scheduled for beginning near the end of March.

L. & J. Weinstein, Hartford, Conn., have commenced the erection of a factory building, brick, three stories, 42 x 42 ft., $10,000.

Repairs occasioned by fire are under way in the amount of $30,000 to the paint shop of John J. Roche & Co., Hartford, Conn., three stories, brick, 51 x 125 ft.

Bids have been received for an $80,000 28 x 40 ft. electric power house for the Nightingale Morse Mills, Inc., Putnam, Conn.

Work has commenced on the one-story 75 x 215 ft. extension to the machine shop of the Mead Morrison Mfg. Co., East Boston, Mass.

A factory and office, $25,000, two stories, 50 x 81 ft., is being erected for its own use by the T. G. Pardy Construction Co., Bridgeport, Conn.

Additions to the factory of Pratt, Read & Co., Deep River, Conn., will be made involving an amount of $35,000, one story, 60 x 70 ft., two stories, 20 x 40 ft. Improvements to be used in manufacture of piano player actions.

The Dolmas Saw Co., 87 Hamlin Street, Providence, R. I., has been organized to manufacture saws. Edward Forsell heads the company.

The N. B. Battery Co., 766 Pleasant Street, New Bedford, Mass., has been organized to manufacture storage batteries. Harold Gardner, 14 Roosevelt Street, heads the company.

The Perfection Toycraft Co., Central Street, West Brookfield, Mass., manufacturer of mechanical toys, etc., has arranged for the occupancy of a two-story building adjoining its works for increased facilities.

The R. Wallace & Sons Mfg. Co., Wallingford, Conn., manufacturer of silverware, has arranged for the erection of a new two-story brick building on Quinnipiac Street, Meridan.

The Narragansett Electric Lighting Co., Westminster Street, Providence, R. I., will increase its capital from $12,000,000 to $15,000,000, the proceeds to be used for extensions and improvements in its plant and system. The company operates at Providence, East Providence, Westerly, Watch Hill and surrounding districts.

The Radium Jewelry Mfg. Co., 38 Friendship Street, Providence, R. I., has been organized to manufacture jewelry specialties. Joseph Rodin, 46 Goddard Street, heads the company.

The Ralph Ring Co., Providence, R. I., has been incorporated with a capital of $12,000 by Alvin M. Herrick, 280 Friendship Street, and Fred P. Vinditto, Providence, to manufacture jewelry.

The O. & J. Machine Co., 116 Gold Street, Worcester, Mass., manufacturer of automatic labeling machines, is developing a new can label machine and plans for extensive production during the year. General expansion is being arranged. J. B. Wickery, New York representative of the company, is connected with the new organization.

The Worcester Engineering Co., Worcester, Mass., has been incorporated by Walter E. Hassam and associates, to operate a local works.

The Westerly Welding & Machine Co., Westerly, R. I., has arranged for the establishment of a plant on Granite Street, leased from the Wilcox Machine Shop.

Pittsburgh

PITTSBURGH, March 17.

William Fisher, Pittsburgh has leased property at 513-15 Water Street from Kaskel Solomon for a total consideration of about $175,000. A three-story machine repair works and automobile service station, 82 x 154 ft., will be constructed by the lessee at an estimated cost of $125,000.

The Keystone Mfg. Co., Elkins, W. Va., has purchased the property of the Elkins Box Co., recently partially destroyed by fire, and plans to rebuild for early operation.

The Gerstner Boiler Works, Pittsburgh, established in 1914 and recently incorporated, is now giving employment to about 120 men. The plant at Thirty-first Street and Penn Avenue is devoted to the manufacture of boilers and stacks, while plant No. 2 at McDonald, Pa., is specializing in the repair of boiler tubes and tube production. E. P. Gerstner is president.

The Duquesne Wire Rope Co., Pittsburgh, has been incorporated with a capital of $10,000 by William Simpson and associates to manufacture wire rope.

A pumping plant, 28 x 40 ft., will be constructed by the Consumers Mining Co., Bessemer Building, Pittsburgh, at its works at Harmarville.

Baltimore

BALTIMORE, March 17.

The Water Department, Baltimore, is planning the installation of a new centrifugal pump operated by steam turbine, with capacity of 30,000,000 gal. per day, with waterworks condenser, estimated to cost $75,000, to be used at the Mount Royal pumping station; also a centrifugal booster pump, electrically operated, with capacity of 1,000,000 gal. per day, to be installed on Belair Avenue, near Erdman Avenue station.

The plant of the Aluminum Ore Co., a subsidiary of the Aluminum Co. of America, Oliver Building, Pittsburgh, to be located at Sollers Point, will require considerable electrical, mechanical and machine equipment. While intentions have been announced to proceed with the construction of the plant, it is understood that active work will not commence for a few months, with plans to provide for a completion of a section of the works to allow operations in 1920. The plant will include machine shop, forge shop and a number of general shop buildings; a power plant will be constructed with initial installation of about 4000 kw. capacity in electric generators, steam driven; the boiler plant will be provided with a battery of marine type boilers, equipped with automatic stokers, blowers, and with over-head coal bunkers.

The C. D. Pruden Co., Warner Street, Baltimore, manufacturer of sectional steel buildings, has incorporated the Pruden Steel Building Co., Charleston, W. Va., with capital of $15,000, to act in co-operation with the present company. C. D. Pruden, president and treasurer of the C. D. Pruden Co., heads the new organization.

In connection with the proposed new works of the Canion Air Brake Co., Calvert Building, Baltimore, plans are under way for the erection of a one-story machine shop, about 100 x 250 ft., with foundry and pattern shop buildings adjoining, for early occupancy. It will be for the manufacture of special valves, metal automobile rims and other specialties. W. G. Canion is president.

The Baltimore Copper Smelting & Rolling Co., Fourth Avenue and Fifth Street, Baltimore, will build an addition, 41 x 56 ft., to cost $4,000.

The Standard Oil Co., Baltimore, will build a one-story addition to its boiler house at First Avenue and Eighth Steret, Baltimore, to cost $10,000. It will be 45 x 94 ft. Ten 250-hp. boilers will be installed.

The Jacob C. Shafer Co., 516-20 West Lexington Street, Baltimore, will install 500 hp. in motors.

The Martin Fertilizer Co., Fourth Avenue and Clinton Street, Baltimore, will install 400 hp. in motors.

The Navy Department plans to build a large boiler plant at Hampton Roads, Va.

H. M. Branberry, Norfolk, Va., will build an auto repair shop to cost about $15,000.

The National Shale Brick Co., Martinsburg, W. Va., wants prices on machinery. C. V. Aler is president.

Additional machinery may be installed by the Asheville Power & Light Co., Asheville, N. C.

Prices on electric motors up to 50 hp. are wanted by the Hammer Lumber Co., Newbern, N. C.

The Wall Motor Co., Beaufort, S. C., will build a garage and install some machinery.

The Baltimore County Water & Power Co., 100 West Fayette Street, Baltimore, will build a one-story pumping plant at Dickeyville, Md.

The Owens Electric Welding Co., Washington, D. C., has been incorporated in Delaware with capital of $100,000 by W. J. Dow, L. F. Sarscer and K. King, Cornwell, to manufacture welding equipment, etc.

In connection with the two-story service building to be erected by the Brigman Motor Co., Atlanta, Ga., machine works will be set up for repair operations. The structure will provide about 40,000 sq. ft. of floor space, and is estimated to cost $125,000. J. A. Brigman is president.

The Terry Shipbuilding Co., Savannah, Ga., has reduced its construction force by about 700 men, owing to changes in the plans of the Emergency Fleet Corporation covering the building of composite ship hulls.

The Hickory Handle & Mfg. Co., Conover, N. C., is planning to increase the capacity of its plant.

The United States Potash & Brick Corporation, Roanoke, Va., recently organized with a capital of $1,000,000, is arranging for the construction of a new plant to cost about $500,000. It has selected a site in this vicinity for the works, which will have a capacity of close to 500,000 bricks per day. Machinery will be electrically operated where possible. H. O. Spangler is president.

The Palafox Shipbuilding Co., Pensacola, Fla., has been incorporated with a capital of $75,000 by Frank E. Wells, A. E. Langford and E. J. Trovack.

The Jacksonville Ship Outfitting Yards, Jacksonville, Fla., has received a contract for the installation of machinery and equipment in four concrete cargo vessels now being constructed at the plants of A. Bentley & Sons, Jacksonville, and the North Carolina Construction Co., Wilmington, N. C. J. C. Temple is general manager.

Chicago

CHICAGO, March 17.

While dealers continue to do a fairly satisfactory business, there is in some directions a little less activity. The amount of prospective business which has progressed almost beyond the inquiry point and is, in fact, near closure, is most encouraging, this being particularly so in the case of milling machines. A tendency on the part of purchasers to move slowly is seen, and it probably is attributable to the hesitancy now prevailing in the buying of raw materials. There is no prospect of any general decline in machine-tool prices, such as probably will come in steel, but the situation with regard to the latter has a sympathetic effect. At the same time some who contemplate the purchase of tools believe they will be able to do better later on, their view being based, probably, on the reductions which have been anounced here and there. A planer manufacturer has reduced his price something over 15 per cent.

Several sellers have taken on new salesmen or contemplate doing so, and are sanguine that good business is ahead. Tool manufacturers visiting Chicago expect the export trade to be good, though at present their best opportunity is with neutral countries. Japan recently took 20 lathes, and Great Britain, despite her embargo, is endeavoring to have reinstated an order for about 40 milling machines, the order having been canceled previously.

The Emerson-Brantingham Co., Rockford, Ill., has bought an implement factory at Auburn, Ill., and will move the contents to its own plant. The company has been a purchaser of a few new tools also.

Tyler & Hippach, manufacturers and jobbers in plate and window glass, 366 West Ohio Street, Chicago, are endeavoring to locate manufacturers of an automatic machine for beveling glass. The machines required must bevel ovals and circles.

The Semi-Steel Test Foundry Co., G. B. Wolf, president, and Erik E. Lindgren, secretary, 4916 Bloomingdale Avenue, Chicago, is taking bids on the one-story foundry, 49 x 85 ft., which it will build at a cost of about $15,000.

The Garfield Artificial Ice Co., 310 Turner Avenue, Chicago, has let the general contract for a one-story ice factory, 57 x 129 ft., in Turner Avenue, to cost $12,000.

The E. L. Archibald Co., 111 West Washington Street, Chicago, has been awarded the general contract for a three-story factory, 75 x 170 ft., in West Chicago Avenue, near California Street, for the Commercial Furniture Co., 2934 West Superior Street, to cost $75,000.

The Remmert Mfg. Co., Belleville, Ill., has been formed with a capital stock of $250,000 to manufacture washing machines and machinery. Among the incorporators are Emil Coil and William Remmert.

The Inland Rubber Co., West Twenty-seventh Street, Chicago, has arranged for the erection of a two-story extension, 87 x 112 ft., to cost about $50,000.

The Victor Mfg. & Gasket Co., South Troy Street, Chi-

...ago, is planning for the erection of a one and two-story plant on Twelfth Street and Fifty-eighth Avenue, 200 x 600 ft., to cost about $200,000.

The Axby Hardware Co., Chicago, has been incorporated with a capital of $10,000 by R. J. and Hardin McLaughlin and Henry Hakenson, to manufacture hardware specialties.

The Vitanola Talking Machine Co., Fifty-second and Seventeenth streets, Chicago, is asking for bids for the erection of its proposed new plant, estimated to cost about $15,000.

The city officials, Benson, Minn., are planning for the erection of an addition to the municipal electric-lighting plant to cost about $30,000. Theodore H. Lee is superintendent; W. E. Skinner, Plymouth Building, Minneapolis, is engineer.

The Brunswick-Balke-Collender Co., Chicago, manufacturer of refrigerators, talking machines, billiard tables, etc., is arranging for the construction of an addition to its plant at Dubuque, Iowa. The work will consist of extensions to the motor building and other departments, about 60 x 80 ft. and 100 x 250 ft., and is estimated to cost about $80,000.

The City Threshing Machine Co., Mason City, Iowa, is planning for the erection of an extension, 40 x 80 ft., to cost $7,000.

The Keystone Potato Planter Co., Sterling, Ill., has had plans prepared for the construction of a new two-story and basement plant, 32 x 70 ft., for the manufacture of agricultural implements.

Detroit

DETROIT, March 17.

With all industrial and civic organizations concentrating on a "build now" campaign and a considerable amount of new construction work already under way, the local machine-tool trade anticipates an era of great activity within the next 12 months.

Many factories which were enlarged during the war are undergoing additional increases and all efforts are being centered on peace-time production on a much broader scale than before.

In addition to these activities there are a number of other large plants still involved in war work, but which are operating on short time so that equipment facilities can be changed over to meet normal needs. The Lincoln Motor Co., which during the war was the largest producer of Liberty motors in the country, is shifting the entire plant over to lines of new production, the nature of which has not yet been announced.

The continued absorption of surplus labor indicates beyond question that Detroit industries are going ahead in their normal lines on a greatly enlarged basis.

Henry Ford and his son, Edsel B. Ford, president Ford Motor Co., have announced their intention to withdraw from the Ford Motor Co., and establish a new firm with factories in various sections of the United States to produce a motor car which will sell at from $250 to $350. Henry Ford some time ago withdrew as president of the company and placed the motor plant in the hands of his son. The recent Supreme Court decision whereby the company was ordered to distribute $19,000,000 of accumulated profits is declared by Edsel Ford to be the reason for their decision to withdraw from the company. Edsel Ford declares that the Ford holdings in the Ford Motor Co. will be retained and that the stock of the new company will be held intact by members of the family alone. "The plan of dividing our plant among many cities is one we have decided upon after deep study," said Edsel Ford. "We expect to start work in the early part of next year. We are hunting water power sites and so far have only two definite locations, and they were bought primarily for tractor factories at Hamilton, Ohio, and Troy, N. Y." The Ford system of assembling plants in large cities will be followed by the new company, according to Mr. Ford, building up a sales organization independent of that used by the existing company.

The Goddard Tool Co., Detroit and Chicago, is increasing its Detroit manufacturing equipment 25 per cent. Paul H. Goddard, president, states the company is contemplating the erection of additional buildings. The plant now has 14,000 sq. ft. of floor space. LeRoy S. Rawson, manager of the Detroit factory, was formerly with the Barber-Colman Co. of Rockford, Ill.

The Detroit Electric Car Co., Detroit, has been incorporated with capital stock of $600,000 to make chassis for the Anderson Electric Car Co. It has leased the plant formerly occupied by the Peter Smith Heater Co., which provides 75,000 sq. ft. of floor space. W. C. Anderson is president.

The Commerce Motor Car Co., Detroit, has prepared plans for an addition, which when completed will provide 100,000 sq. ft. of floor space.

The Saxon Motor Car Corporation, Detroit, is reported to be perfecting reorganization plans which will involve occupation of its new plant, built before the war, but never occupied.

The Detroit Seamless Steel Tubes Co., Detroit, has purchased 60 acres on West Warren and Wyoming avenues as the site for its proposed $2,000,000 plant.

The C. R. Wilson Body Co. has appropriated $500,000 to build a new plant on the site of the unit recently destroyed by fire. The officers are: C. R. Wilson, president, George D. Wilson, vice-president; R. W. Allen, vice-president; C. Haines Wilson, secretary and treasurer; W. D. Gridley, assistant secretary and treasurer.

The Central Forge Co., Detroit, has let contracts for the erection of an addition to the heat treating and forge shop at Euclid Avenue and Grand Trunk Railroad.

The Holley Carburetor Co., Detroit, has let contracts for a two story brick factory and a one story frame boiler house.

The Morgan & Wright Tire Co., Detroit, is erecting a seven-story reinforced concrete factory building.

The Mueller Metals Co., Port Huron, Mich., has reconverted its plant to peace basis. The company is now at work on orders for brass rods, brass and copper tubing, brass forgings, die castings, aluminum forgings and white metal die castings, as well as brass and steel screw machine products. Mechanical equipment is being installed for the manufacture of crankshafts and other automobile parts.

The Frost Gear & Forging Co., Jackson, Mich., has increased its capital stock from $350,000 to $750,000, and will begin at once the erection of an addition to its plant. E. J. Frost is president and general manager.

Plans are being prepared for rebuilding the plant of the Romeo Foundry Co. at Port Huron, Mich., recently destroyed by fire with a loss of $150,000.

The Mt. Clemens Foundry Co., Mt. Clemens, Mich., is being incorporated with a capital stock of $500,000, and is expected to start operations for the manufacture of automobile and tractor castings.

The Fenton Machine Tool & Die Co., Fenton, Mich., is arranging for financing plant enlargements.

The Wilson Foundry & Machine Co., Pontiac, Mich., will erect an addition, 100 x 800 ft.

The Machinery Co. of America has removed its general offices from Grand Rapids to Big Rapids, Mich.

Milwaukee

MILWAUKEE, March 17.

New business continues to be placed in fair quantity, consisting of single tools or small lots from scattered sources, in which automotive industries predominate. Bids have been entered by local tool builders on parts of several large lots that have recently made their appearance, but beyond this they are depending largely upon a run of small orders to keep facilities occupied. The feeling of hesitancy that has pervaded virtually every line of manufacture for some time past is gradually being overcome, but the process is slow. One thing that is helping materially to improve the situation is that the idea of lower prices, which was generally held at the beginning of the year, seems to have disappeared because of developments indicating the reverse.

According to well-defined but unconfirmed reports, the A. O. Smith Corporation, Milwaukee, manufacturer of pressed steel frames, automobile parts and similar products, is preparing to make extensions which will practically double the size of present works at Twenty-seventh and Hopkins streets and Keefe Avenue, and involve an additional investment of approximately $1,500,000. Inquiry at the general offices of the company met with the response that it is not ready to make any statement at this time. About two years ago unnamed interests acquired 188 lots, embracing about 60 acres, adjoining the site of the Smith works, at an expenditure of $250,000. Surveyors were put at work, but activities ceased when war was declared. Within the last few days applications have been made for the vacation of certain streets dividing the tract. It is reported on excellent authority that construction work will soon begin and that the project will be in charge of Westinghouse Church Kerr & Co., New York. The prospective requirement of machine tools is believed to be one of the largest to appear since the war period. L. Ray Smith is president and general manager.

The Wisconsin Gun Co., Milwaukee, formally ceased operations on March 15 and turned the plant and equipment over to the Government. Practically all of the 400 or more skilled machinists have obtained employment in other local

shops. For the time being only a small clerical force is retained.

The Marwin Motor Truck Co., Kenosha, Wis., has purchased the former plant of the Charles Skidd Mfg. Co. for $22,500, which it has occupied under lease. Enlargement of the shop and installation of some additional tool and other equipment is under consideration.

The Gerlinger Electric Steel Foundry Co., Milwaukee, which placed its new casting shop at Fifty-ninth and National avenues in operation on Jan. 16, has awarded contracts for the erection of a one-story addition, 84 x 150 ft., to be used as a molding floor. Only a few small items of equipment will be required. The main foundry is equipped with a 3-ton Moore furnace. Walter Gerlinger is secretary.

The United States Tractor & Machinery Co., Menasha, Wis., has been incorporated with an authorized capital stock of $250,000 to take over the business of the United States Tractor Co., Chicago, which is moving its plant and headquarters to Menasha. The incorporators are Joseph G. Sailor, George G. Barlow and Dr. A. B. Jensen, all of Menasha. Mr. Sailor retired recently from the Sailor-Whitmore Machine Co., which was reorganized as the Whitmore Foundry & Machine Co. The new corporation has plans for a one-story brick and concrete machine shop, 60 x 150 ft., to be the first unit of the new tractor manufacturing plant. Work will begin about April 1. A. E. Harris will be general manager.

The Langstadt & Meyer Co., Appleton, Wis., contemplates the erection of a factory and shop costing about $50,000 for the manufacture of direct-connected generating units, farm lighting systems and other electrical equipment and appliances. Details of the project are not yet available. A. H. Meyer is secretary.

The Adjustable Fixture Co., 305-308 Manufacturers' Home Building, Milwaukee, manufacturer of electric lighting and power distribution appliances, has increased its capital stock from $25,000 to $50,000 preparatory to increasing its facilities and output. Henry W. Schumaker is president.

Edward Harrington, 601 Milwaukee Avenue, Kenosha, Wis., began work March 15 on an automobile repair and machine shop, 50 x 80 ft.

The Topp-Stewart Tractor Co., Clintonville, Wis., is purchasing additional machine tool and other equipment costing about $20,000 and will increase its working force from 55 to nearly 100 as soon as the installation is made. A. B. Topp is president.

The Wisconsin Auto Body & Sales Co., Milwaukee, organized recently with a capital stock of $25,000, has acquired the two-story building at 416-418 Cedar Street and will convert it into a factory and workshop. Robert Knittle is president.

The B. V. Milking Machine Co., 114 Grand Avenue, Milwaukee, has increased its capital stock from $75,000 to $150,000 and will proceed with the erection and equipment of its new manufacturing plant, which will cost about $50,000. Charles Somers is president and H. F. Bodeker secretary.

The Fort Howard Paper Co., Green Bay, Wis., has been incorporated with a capital stock of $350,000 and will build a tissue and crepe paper mill costing about $150,000 and having an initial capacity of 50 tons per day. Plans are being prepared by Thomas W. Orbison, consulting engineer, 814 College Avenue, Appleton, Wis., and will be ready for bid about April 1. A. E. Cofrin is general manager.

The Folding Furniture Co., Stevens Point, Wis., has plans for a three-story brick and mill factory building, 60 x 150 ft., and is in the market for wood-working, motor and other equipment. The investment in plant and machinery will be about $50,000. John Worzola is general manager.

The Lull Truck Co., Wausau, Wis., which has entered into a contract with the city of Wausau for the use of an unfinished factory building and 30 acres of land for three years, with privilege of purchase, will start work at once. It also will increase its capital stock from $10,000 to $250,000 to finance the project and production of a single 2-ton motor truck chassis. Inquiry is being made for machine tools and other equipment. Karl Mathie is secretary and manager.

The Taylor-Schmidt-Fisher Co., Ladysmith, Wis., has been formed to manufacture tool handles and other hardwood specialties. The former Jahnke Creamery Co. factory will be remodeled and equipped with new machinery. Elmer A. Taylor is president and manager.

The K. & F. Specialty Co., Kenosha, Wis., has plans by Charles Augustine, architect, for a one-story brick and concrete shop and office building, 60 x 137 ft., costing $15,000 without equipment. The company manufactures metal specialties.

The Peerless Paper Products Co., Menasha, Wis., has purchased a site on Little Lake, Butte des Mortes, and will build a new pulp and paper mill costing from $75,000 to $100,000. Plans are now being prepared. T. E. Morgan is general manager.

Cincinnati

CINCINNATI, March 17.

In a canvass of the local machine tool industry, which included 48 plants, in answer to an inquiry as to the condition of the trade, the following percentages of replies were received: Fair, 14; good, 7; excellent, 3; normal, 2; quiet, 8; poor, 14. Thirty-five plants report working full time and 13 from 75 to 90 per cent full time. Fourteen report they are doing some work for the Government. As to the number of men employed, 24 report they are employing a normal number of workmen, three state the number employed as being above normal and 20 report the number below normal. Only 132 women are employed in 11 plants, and only a few of these are doing work formerly performed by men. All plants report that there is no excess of skilled mechanics, but 14 state there is an excess of unskilled labor. As to wages, 25 state they are higher than they were one year ago, and 17 say they are paying the same rate.

From this it will be noted that there is no excess of unemployed skilled labor in this vicinity and the number of unskilled men out of jobs is not nearly as large as has been rumored.

Orders for machine tools are still being received from automobile manufacturers and export business is also showing more signs of life. Manufacturers of heavy punching and shearing machines have several months' work ahead of them, and while they are receiving a large number of inquiries, most of these are slow in developing into orders. Jobbing foundries are busier than they were 30 days ago.

The Receiving Register Co., 512 Reading Road, Cincinnati, maker of traveling cash box systems used in stores, will increase the capacity of its plant at an early date.

The Globe-Wernicke Co., Norwood, Ohio, has let contract for additions to its plant, estimated to cost $200,000. The principal structure will be 75 x 350 ft., three stories and of fireproof construction. It will be used for the manufacture of steel cabinets and filing cases.

The F. K. Vaughn Co., Hamilton, Ohio, has been awarded contract for the initial buildings for the Ford tractor plant to be located in Hamilton.

The Dayton Pump & Mfg. Co., Dayton, Ohio, contemplates, increasing the capacity of its plant. F. M. Tait is president.

The Liberty Tool & Production Co., Dayton, Ohio, recently incorporated with $50,000 capital stock, has taken over the entire equipment of the Doty Mfg. Co. Fred A. Stevens is president of the company, H. L. Beeler, vice-president and treasurer, and C. M. Lupton, secretary.

The Columbus Tire & Rubber Co., Columbus, Ohio, has been incorporated with $1,200,000 capital stock by John W. Zuber and others. It expects to manufacture tires and inner tubes, as well as horseshoe pads and other rubber specialties.

The Lancaster Tire & Rubber Co., Columbus, has increased its capital stock from $500,000 to $800,000.

The Ohio Valley Machine Co., Marietta, Ohio, has been incorporated with $80,000 capital stock by W. E. Sykes and others. It will engage in general machine shop work, but will pay special attention to repair work for oil well operators.

W. S. Hitchcock, Portsmouth, Ohio, contemplates the erection of a fire brick plant in a suburb of Portsmouth.

The Newark Stamping & Foundry Co., Newark, Ohio, maker of hot air furnaces and other specialties, will double the capacity of its plant at an early date.

The Anderson Foundry & Machine Co., Anderson, Ind., has been incorporated with $1,200,000 to manufacture gasoline and steam engines. W. N. Durbin is one of the incorporators.

The Miami Trailer Co., Troy, Ohio, has bought a plant on South Clay Street which will be equipped at an early date for the manufacture of trailers. The present output will be increased about 50 per cent.

Cleveland

CLEVELAND, March 17.

A fall appeared in the machine-tool market the past week and business was confined almost wholly to single machines or to small lots, mostly from makers of automobiles and automobile parts. The rubber tire industry is bringing out some orders from Akron for boring mills and other machines and a contract was placed in Cleveland for a boring mill for export to a Glasgow, Scotland, rubber company.

The demand for second-hand machinery is holding up well, but in spite of the large amount of machinery placed on the market recently dealers report a scarcity of standard lathes, planers, milling machines and punching and shearing machinery. Many manufacturers are understood to have purchased at low prices Government machinery in their plants, and are either storing this for future use or looking for other work to keep it busy. It is claimed that prices on second-hand machinery are a little firmer and that some of the low levels which prevailed two or three weeks ago have disappeared.

Conditions in the local gray iron foundry trade have improved slightly the past week or two and plants are being operated on an average of about 60 per cent capacity. Some Akron foundries have all the work they can do for the rubber industry and others have practically none. Orders for castings are coming almost wholly from the automobile and allied industries.

Malleable iron foundries report the demand for castings showed some improvement the past two or three weeks, but the volume of business is still unsatisfactory. The increased business has come largely from automobile builders and makers of automobile accessories who are gradually increasing their production. The call for castings for motor trucks is light, indicating that the production of trucks is not yet on a normal basis. Orders from implement manufacturers are also rather disappointing and those from the railroads are light, being almost wholly for repair work. Some increase in the demand for machinery castings is noted.

Prices on malleable castings are very irregular in the Central West and East. Some foundries are taking orders at prices that it is claimed will return no profit. Others are adhering to the price schedule in effect the last quarter of 1918. Some manufacturers are using this schedule as a basis and are quoting prices from 5 to 10 per cent lower than the schedule. Still others are not using this schedule, but are quoting prices substantially lower.

Local manufacturers report a scarcity of various classes of skilled labor for machine shop work in spite of the Government reports of the large number of unemployed in this city. While the labor situation has improved somewhat the past week or two, the change is not to the extent indicated by Government figures, which show 60,000 men out of work in Cleveland as compared with the report of the previous week of 75,000. It is believed that both of these Government reports greatly exaggerate the unemployment situation.

The Ferro Machine & Foundry Co., Cleveland, is enlarging the capacity of its plant by the installation of a third cupola and will put in sand conveying equipment to provide for continuous molding. Some additional cleaning equipment will also be added. Changes and extensions are being made to provide additional capacity for the manufacture of transmission housings for Fordson tractors. The output of these housings will be increased from 125 to 400 per day. The Whiting Foundry Equipment Co. has the contract for the cupola and the C. O. Bartlett & Snow Co. is installing the sand conveying equipment.

The Cleveland Automobile Co. has placed a contract with the Crowell-Lundoff-Little Co. for its new automobile plant. The main building will be 80 x 602 ft., four stories and will be largely an assembling plant, and little machine tool equipment will be required. A power house will also be built. J. V. Whitbeck, chief engineer of the Chandler Motor Car Co., which is controlled by the same interests, is president; S. J. Black, vice president, in charge of sales; J. I. Kroll, treasurer; R. C. Hodge, purchasing agent; E. O. Carlson, production manager, and Ernest Woller, chief engineer.

The Walker Motor Co., Cleveland, has acquired property at East 131st Street and Taft Avenue, on which is located a one and two-story building containing 18,000 sq. ft. of floor space, and plans to erect a four-story steel and concrete building containing 100,000 sq. ft. of space, which will be used for the manufacture of automobile parts. H. J. Walker, of the H. J. Walker Co., which occupies an adjoining plant, is president of the new company, and Norman Walker is secretary-treasurer.

The Reflex Ignition Co., 409 Superior Building, Cleveland, has taken bids for a new plant, 80 x 160 ft. H. M. Morse & Co., Citizens Building, are the architects.

The H. K. Ferguson Co., Cleveland, has been awarded a contract by Pilkington Brothers, Ltd., England, to build an addition to its plant at Thorold, Ont. It will be a box-making shop with structural steel frame and brick exterior. The Ferguson company has also started work on a warehouse at Port Ivory, Staten Island, N. Y., for the Procter & Gamble Co. Plans for this were made some time ago but permission to build was withheld by the Government for the duration of the war.

The Cleveland-Duplex Machinery Co., Cleveland, has been incorporated with a capital stock of $20,000 to succeed the Duplex Machinery Co., dealer in new and used machinery, 1224 West Sixth Street. G. J. Hawkey, who was at the head of the Duplex Machinery Co., is president of the new company, and Richard Goedecke is vice president and sales manager. Ensign T. D. Britton, recently connected with the United States Navy Steam Engineering School, Hoboken, N. J., has become associated with the company.

The Drake Process Machinery Co., 1255 West Fourth Street, Cleveland, contemplates the erection of a three-story plant, 50 x 160 ft.

The Standard Oil Co. will shortly begin the erection of a large refinery in East Toledo, Ohio, which will involve an initial investment of between $4,000,000 and $5,000,000. It is stated that with extensions to be built later, this plant will eventually be the largest refinery in the world. Contracts for the buildings, which will be of reinforced concrete and steel, will be placed shortly.

The Newark Stamping & Foundry Co., Newark, Ohio, has purchased the foundry and other equipment, patent rights and good will of the May-Fiebeger Co., Akron, Ohio, manufacturer of house heating furnaces, and will move the equipment to Newark shortly. It is stated that this purchase will necessitate the enlargement of the Newark plant.

The Canton Rim Co., 308 Daily News Building, Canton, Ohio, plans to begin the erection of a factory building shortly. The company was organized nearly two years ago with a capital stock of $100,000 but was delayed in carrying out its plans because of the war.

The Diebold Safe & Lock Co., Canton, is erecting a new two-story brick and steel factory, which will provide 12,000 additional sq. ft. of floor space.

The Biggs Boiler Works, Akron, has placed a contract for the erection of a plant, 55 x 212 ft.

The Akron Equipment Co., Akron, will let a contract for the construction of a machine shop, 30 x 77 ft.

The Rubber Products Co., Barberton, Ohio, will enlarge its plant by the erection of a building, 50 x 100 ft., and the addition of a wing to its main building.

The Lima Metal Products Co., Lima, Ohio, has been organized with a capital stock of $10,000 to manufacture radiators, hoods, fenders, etc., for automobiles. It will establish a plant at 308 West Wayne Street, under the management of Harry W. Falk.

Raymond W. Miller and John A. Manecke, Tiffin, Ohio, have purchased the Blaser Body Co. plant, Fostoria, Ohio, including one building 45 x 330 ft., and another 35 x 180 ft., and will continue the manufacture of automobile tops.

An addition is being built to the Cleveland warehouse of Wheelock, Lovejoy & Co., Inc., 1800 Columbus Road, which will nearly double the present storage capacity. In addition to Hy-Ten special machinery steel, they will now carry in stock a complete line of Whelco carbon and high speed steels as well as Globe drill rods.

Indianapolis

INDIANAPOLIS, March 17.

The Columbus Wood Turning Co., Columbus, Ind., recently organized, has contracted for a building which it will equip to manufacture handles for small tools. The officers are Harry Chapman, president; vice-president, Albert W. Phillips; secretary, Virgil W. Seal; treasurer, David C. Behrman.

Capitalists at Evansville, Ind., will organize a company to manufacture a farm tractor, developed by Graham Brothers of that city. Among those interested are William H. McCurdy, president of the Hercules Buggy Co., Benjamin Bosse, mayor of Evansville and Henry C. Murphy, publisher of the Evansville *Courier*. It is reported that $500,000 of the capital has been subscribed. J. B., Robert C., and Ray A. Graham will be active in the management.

The Liberty Wire Nail Machine Co., Kokomo, Ind., has been incorporated with $100,000 capital stock, to manufacture wire nail machines. The directors are Adam H. Knipfer, Charles G. Weger, Charles E. Little, William M. Ormsby and Ira J. Reed.

The J. D. Hunt Mfg. Co., Indianapolis, has been incorporated with $4,000 capital stock, to manufacture trunks. The directors are Joda D., M. L. and R. Roy Hunt.

The Indiana Tank & Boiler Works, Inc., Indianapolis, has increased its capital stock from $10,000 to $25,000.

The Howard Shipyards & Dock Co., Jeffersonville, Ind., has obtained a contract from the Railroad Administration for three tunnel towboats for service on the Warrior River, Alabama.

T. F. Vaughn, president Wabash Cabinet Co., Wabash, Ind., is prime mover in the organization of the Wabash Tractor Co., which is to establish a plant in that city.

The Evans Truck & Axle Co., Auburn, Ind., has increased its capital stock from $10,000 to $500,000.

The Studebaker Corporation, South Bend, Ind., has plans under way for the construction of a new forge shop, one-story foundry, 125 x 500 ft., assembling works, carbonizing shop and other structures.

The Annex Foundry Co., Elkhart, Ind., has been incorporated with a capital of $30,000 by Theodore A. Runyon, George W. Fleming, William T. Kough and others to manufacture iron and steel castings.

A new one and two-story car repair shop, 60 x 190 ft., will be constructed by the Terre Haute, Indianapolis & Eastern Traction Co., Terre Haute, Ind., on East Wabash Avenue.

The Indiana Electric Service Co., East Chicago, Ind., has been incorporated with a capital of $10,000 by Philip N. and John Sendak, and Samuel Samuels, East Chicago, to manufacture electrical goods.

The Universal Accessories Co., 238 South Meridian Street, Indianapolis, manufacturer of automobile equipment, has increased its capital from $10,000 to $100,000.

St. Louis

ST. LOUIS, March 17.

The Majestic Coal Co., Fort Smith, Ark., has been organized with $100,000 capital by W. J. Pendergrass, O. M. Pendergrass and others and is in the market for mining machinery and power-plant equipment.

O. Kochtitzky, Cape Girardeau, Mo., with a large dredging contract near Lonoke, Ark., is reported in the market for additional dredging equipment.

The Healdton Pipe Line Co., Oklahoma City, Okla., capital $600,000, organized by Dorset Cater, B. M. Hails and M. M. Gibbens will equip a pipe line and is in the market for oil pumping equipment.

The Oklahoma Producing & Refining Co., Tulsa, Okla., has increased its capital by $2,000,000 to add to its refinery capacity.

The National Shipbuilding Co., Violet, La., A. H. MacAdams, vice-president, Three Rivers, Que., will improve its plant on Lake Borgne Canal, including a dry-dock to cost $1,000,000.

The Water, Light & Transit Co., Carrollton, Mo., will install centrifugal pumps and add other equipment to its waterworks plant. E. E. Harper, Kansas City, Mo., 2408 E. Thirtieth Street, is engineer in charge.

J. D. Pace and others, Alexandria, La., will equip a veneer plant and are in the market for machinery.

The Burnham Engineering Co., Glenwood, Ark., is in the market for ice-making machinery.

The city of Macon, Mo., is receiving bids for one 450 k. v. a. generating unit direct connected to Corliss engine and other equipment. Frank L. Wilcox, Syndicate Trust Building, St. Louis, is engineer in charge.

The Coro-Holmes Co., Memphis, Tenn., has been incorporated with a capital of $50,000 by L. S. Coro, H. J. Holmes and W. E. Moore, to manufacture automobile trucks and parts.

The American Hame & Singletree Co., Sidney Street, Chattanooga, Tenn., is considering plans for rebuilding its works, recently destroyed by fire, with loss of about $25,000. E. A. Wright is general manager.

New machinery and equipment to cost about $5,000 will be installed in the cotton ginning plant, 40 x 60 ft., to be erected by J. R. Lowe & Co., Leesburg, Ala.

The R. J. Barr Motor Co., Troy, Ala., has been incorporated with a capital of $20,000 by R. J. Barr and Fox Henderson, to manufacture motor parts, etc.

The American Motor Co., Lexington, Ky., has been incorporated in Delaware with capital of $50,000 by J. T. Dunn, F. E. Bradley and A. C. Stallard, Lexington, and T. P. Bradley, Louisville, to manufacture automobile parts, etc.

The Chickasaw Cooperage Co., McGehee, Ark., is planning for the rebuilding of its plant recently destroyed by fire with loss of about $10,000.

Texas

AUSTIN, March 15.

Complaint continues of the serious congestion of railroad freight traffic leading into the central west Texas oil fields. Enormous shipments of oil well and pipe line equipment, as well as various kinds of building material, have caused accumulation of loaded freight cars within more than 100 miles of the oil producing center.

George H. Ford, Dallas, will install additional machinery in his electric light plant at DeLeon at a cost of about $40,000.

The New-Tex Refining Co. is assembling material for the construction of a 2000-bbl. oil refinery at Wichita Falls. The company is headed by Dr. E. B. Bailey and has a capital stock of $200,000.

The Home Oil & Refining Co., Fort Worth, recently incorporated with a capital stock of $5,000,000, has let contract for the construction of a refinery at that place to the W. C. Hedrick Construction Co. W. M. Babcock, Tulsa, is president.

The Texas Producing & Refining Co., Fort Worth, has been incorporated with a capital stock of $2,000,000, and will construct an oil refinery. The incorporators are W. H. Newberry, Childress; M. B. Kelly, Wichita Falls, and John Gee, Forth Worth.

The Texas-Ranger Producing & Refining Co. has been incorporated at Dallas with a capital stock of $1,500,000, and will build a refinery and develop oil holdings in the central west Texas fields. The incorporators are Cecil H. Schmidt, Jr., and J. C. Alworth, Dallas.

The Alto Mill & Lumber Co., Texarkana, which has a capital stock of $50,000, will build a lumber mill. R. C. Cowan is one of the stockholders.

Morris & Co., Chicago, have purchased a site at Houston upon which they will construct a cold-storage plant to cost about $200,000.

The Eldorado Refining Co., Eldorado, Kan., will build an oil refinery at Forth Worth, with a daily capacity of 5000 bbl.

George Newer, Wichita Falls, and associates will build an oil refinery with a daily capacity of 1000 bbl.

W. R. Spann, Shreveport, La., and associates have adopted plans for an oil refinery, to be built at Fort Worth, with a daily capacity of 1500 bbl.

The Ok-In Producing & Refining Co. has purchased property at Birdville upon which it will build an oil refinery with a daily capacity of 5000 bbl. The proposed plant will cost about $250,000. G. W. Merrill, Fort Worth, is president.

The Humble Oil & Refining Co., which recently sold a one-half interest in its holdings to the Carter Oil Co., will build a 10,000-bbl. lubricating plant on the Ship Channel near Houston. It is stated that the plant will cost more than $2,000,000.

A special election will be held at San Angelo, March 29, to vote on a $500,000 bond issue for the establishment of a municipal electric power plant and waterworks.

The Board of Trustees, Teague, Tex., has granted a franchise to T. L. Childs and associates for the construction of an electric power plant.

The Gulf Well Machinery Mfg. Co., Abilene, Tex., is planning for extensions and improvements in its plant to cost in excess of $150,000.

The Southern Motor Mfg. Association, Beatty Building, Houston, is considering plans for the erection of a new plant for the manufacture of automobile trucks and tractors to cost about $50,000. The company was recently incorporated with a capital of $1,000,000. J. E. Blevins is president.

California

LOS ANGELES, March 10.

The Ventura Mfg. Co., Ventura, Cal., manufacturer of implements, is having plans prepared for the erection of a new plant, estimated to cost $50,000. The first three buildings to be constructed at an early date, will comprise a one-story machine shop, 75 x 220 ft.; forge shop, 75 x 220 ft.; and assembling plant, 50 x 220 ft. Other buildings to be erected at a later date will include a foundry, pattern shop and an addition to the assembling works. W. J. Saunders, Laughlin Building, and A. S. Barnes, Union Oil Building, are the architects.

The Security Mfg. Co., Los Angeles, has been incorporated with a capital of $200,000 by A. B. McCallister, Fred K.

Young and T. R. Coles, to manufacture iron and steel products.

The Columbia Brass Foundry, 722 High Street, Los Angeles, has filed notice of organization to manufacture brass and bronze castings, etc. C. L. Hawse, 3809 Third Avenue, and John Kern, 1335 San Julian Street, head the company.

The General Motors Co., Detroit, is said to be planning for the construction of a new plant at Stockton, Cal., for the manufacture of motor trucks and farm tractors.

The Power Bureau, Department of Public Service, Los Angeles, is completing plans for the erection of a new electric power plant for the municipal power system to be located in the San Francisquito Canyon. The structure will be known as Power House No. 2.

The Southern California Casket Co., Watts, Cal., has been incorporated with a capital of $25,000 by George H. Wood, Frank L. Buster and Louis F. Bopp, to manufacture caskets, etc.

The Marine Equipment Co., Wilmington, near Los Angeles, manufacturer of hardware, etc., has increased its capital from $10,000 to $50,000.

A series of electrically operated pumping plants for irrigation work is planned by the Fruitland Drainage District, Atwater, Cal. Preliminary plans are under way.

Contract has been let to Trewhitt & Shields, Fresno, Cal., for the construction of a one-story machine shop at the plant of the California Associated Raisin Co., East Avenue and Hamilton Street.

The Ferrell Brass Foundry, 110-12 East Seventeenth Street, Los Angeles, has been organized to manufacture brass and bronze castings. Charles G. Ferrell, 3938 South Broadway, heads the company.

Plans are being considered by the Oakdale Irrigation District, Oakdale, Cal., and F. B. Pattee, Oakdale, for the construction of hydroelectric power plants on the north fork of the Stanislaus River, in connection with an irrigation project in this section. The proposed plants will have an initial generating capacity of about 10,000 hp.

The Board of City Trustees, Glendale, Cal., has authorized the preparation of plans for the construction of a municipal electric lighting plant. The proposed station will be hydroelectric, utilizing water power to be developed in connection with extensions to the municipal water works. The entire project is estimated to cost $175,000. H. B. Lynch, Central Building, Los Angeles, is engineer.

The Wilson & Willard Mfg. Co., Los Angeles, manufacturer of oil well tools and machinery, has removed its plant from 2411 East Fifteenth Street to 2301 East Vernon Avenue, Vernon, Cal., to provide for increased output.

The Pacific Northwest

SEATTLE, March 10.

With the return to work of the 25,500 shipyard and allied industrial workers who have been on strike since Jan. 21, and the re-opening of the five big steel shipbuilding plants in Seattle, the first step has been taken toward improving the industrial situation in the Puget Sound district. During the period of inactivity more than $10,000,000 was lost by the workers in wages alone.

Manufacturing has been very quiet, but it is believed that numerous plans under way for extensions and the revival of pre-war projects will soon begin to materialize. A large amount of public work is to be undertaken by the State, cities and counties, and will play an important part in solving the employment problem.

Lumbermen are optimistic over the prospects for spring work. While prices are still unsatisfactory, the outlook for a heavy volume of spring orders is excellent, and mills in some sections are swamped with orders for early delivery.

The Pacific Metal Works, Vancouver, B. C., will build a new foundry on Industrial Island, 60 x 100 ft., to cost $7,000.

The Pacific Power & Light Co., Astoria, Ore., announces that its proposed generating plant will have a capacity of 5000 hp., and will cost about $400,000. It will be located adjacent to present property.

The Harbor & Marine Co., Victoria, B. C., is constructing a shipyard at Hospital Point where contracts for two 8100-ton steel vessels recently secured from the Dominion Government will be carried out.

The sawmill of the Tubbs Lumber Co., Chehalis, Wash., was totally destroyed by fire recently, with a loss of more than $50,000. Herbert Jones is manager.

The Portland Broom Factory, Portland, is moving to a new location, and will add a handle factory to its plant. Motor-driven equipment will be installed throughout.

The Pacific Car & Foundry Co., Portland, has completed the erection of a large machine shop.

The L. Y. Stayton Co., Seattle, plans the construction of a building at Bryn Mawr, for the manufacture of concrete pipe. It will have a daily capacity of one mile of pipe.

Olson & Sunde, Seattle, are having plans prepared for a one-story machine shop. Some new equipment will be installed.

The Olympia Shingle Mill Co., Olympia, Wash., whose plant was destroyed by fire recently, will rebuild at a cost of $30,000.

The Pacific Power & Light Co., Astoria, Ore., is completing plans for a 1500-hp. electric generating plant, adjoining its works.

The city of Colfax, Wash., plans the installation of a small municipal electric lighting plant.

The Pacific Sheet Metal Works, Vancouver, B. C., will erect a new plant on Industrial Island, 60 x 100 ft., at a cost of about $7,000, exclusive of equipment.

Big Lakes Box Co., Kalmath Falls, Ore., will enlarge and electrify its plant and add new cut-off equipment and a large burner throughout.

Canada

TORONTO, March 17.

The Superior Barn Equipment Co., Ltd., Fergus, Ont., has been incorporated with a capital stock of $300,000 by Andrew Dods, Bank of Hamilton Building; Mervil MacDonald, Percy E. F. Smily and others, all of Toronto, to manufacture stable fittings, farm machinery, etc.

The Canadian Ingersoll-Rand Co., Ltd., 260 St. James Street, Montreal, has recently absorbed the Jenckes Machine Co., Ltd., Sherbrooke, Que. The Jenckes Machine Co.'s plant will continue to turn out ships' winches, engines, structural and plate work, mining machinery and other equipment.

The Regina Tire & Repair Co., 1707 Scarth Street, Regina, Sask., is contemplating the erection of a repair shop to cost $10,000. J. C. Wilson is manager.

Ellis & Ellis, Queen Street West, Toronto, are preparing plans for an addition to the plant of the Canadian Foundry Machine Co., 47 Sterling Road, Toronto.

Craik, Sask., is contemplating the erection of an electric lighting plant. C. R. Hainsworth is clerk.

The Town Council, Sydney Mines, N. S., contemplates the erection of a $100,000 electric plant. Y. Barrington is engineer.

The Montreal Locomotive Works, 145 St. James Street, Montreal, is erecting a new building in connection with its plant to cost $32,000. W. S. Robertson is secretary.

Superintendent L. O. Pion, purchasing department, Montreal, is asking for prices on galvanized range boilers and one tubular rivet machine.

W. R. Stewart, 459 Willard Avenue, Toronto, is in the market for a concrete block machine and batch mixer.

C. H. Thornblade, president Pacific Welding Co., Seattle Wash., is in Vancouver, B. C., to secure a site to establish a welding plant to cost between $60,000 and $75,000.

Government Purchases

WASHINGTON, March 17.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington: Schedule 3855, for machine tools, electric drills, engine lathe, and a milling and grinding machine for Charleston, opening April 1; schedule 3861, for 2 turret machines for Norfolk and Philadelphia, opening April 11; specification 3640, for an electric traveling crane for Bellevue, D. C.; specification 3653, for boilers for New York; specification 3670, for cranes for the armor plate and forging handling at Charleston, W. Va.; specification 3680, for an electric crane for shipbuilding slip No. 2 at New York; specification 3707, for boilers and superheaters for Indian Head, Md., Charleston, W. Va., and Charleston, S. C.; specification 3708, for mechanical equipment and piping for Washington; specification 3710, for an electric gantry crane for Indian Head, Md.; specification 3785, for electrical equipment for Pensacola, Fla.; specification 3794, for 6 cranes for Alexandria, Va.; specification 3822, for electric traveling cranes for storage shed at Boston; schedule 3800, for 14 turret and engine lathes and 31 radial and upright drills for Norfolk, opening March 25; schedule 3833, for 1 boring mill for Washington, opening March 28; schedule 3835, for 1 milling machine for Washington, opening March 25.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per lb.
Bars:	
Refined iron, base price	4.17c
Burden's H. B. & S. bar iron, base price	6.30c
Burden's best bar iron, base price	6.50c
Swedish bars, base price	20.00c
Soft Steel:	
¾ to 1⅞ in., round and square	3.97c
1 to 6 in. x ⅜ to 1 in.	3.97c
1 to 6 in. x ¼ and 5/16	4.07c
Rods—⅝ and 11/16	4.02c
Bands—1½ to 6 x 3/16 to No. 8	4.57c
Shapes:	
Beams and channels—3 to 15 in.	4.07c
Angles:	
3 in. x ¼ in. and larger	4.07c
3 in. x 3/16 and ⅛ in.	4.32c
1½ to 2½ in. x ⅛ in.	4.32c
1½ to 2¾ in. x 3/16 in. and thicker	4.07c
1 to 1¼ in. x 3/16 in.	4.12c
1 to 1¼ in. x ⅛ in.	4.17c
⅞ x ⅞ x ⅛ in.	4.22c
¾ x ⅛ in.	4.27c
⅝ x ⅛ in.	5.07c
½ x 3/32 in.	5.77c
Tees:	
1 x ⅛ in.	4.47c
1¼ in. x 1¼ in. x 3/16 in.	4.37c
1½ to 2½ x ¼ in.	4.17c
1½ to 2½ x 3/16 in.	4.17c
3 in. and larger	4.12c

Merchant Steel

	Per lb.
Soft steel bars	3.97c
Tire, 1½ x ½ in. and larger	3.97c
Toe calk, ½ x ⅜ in. and larger	4.72c
Open-hearth spring steel	7.00c
Standard cast steel, base price	15.00c
Extra cast steel	18.00 to 20.00c
Special cast steel	23.00 to 25.00c

Tank Plates—Steel

	Per lb.
¼ in. and heavier	4.27c

Sheets

Blue Annealed

	Per lb.
No. 8 and 3/16 in.	5.12c
No. 10	5.17c
No. 12	5.22c
No. 14	5.27c
No. 16	5.37c

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	5.80c	——
Nos. 22 and 24	5.85c	7.62c
No. 26	5.90c	7.67c
No. 27	5.95c	——
No. 28	6.00c	7.82c
No. 29	6.10c	——
No. 30	6.20c	——

No. 28, 36 in. wide, 10c higher.

Genuine Russia, as per assortment 22½ @ 25c

Woods Keystone Hammered, 18-24 gage, 10c.; 26-28 gage, 11c.

Galvanized

	Per lb.
No. 14	6.10c
No. 16	6.25c
Nos. 18 and 20	6.40c
Nos. 22 and 24	6.55c
No. 26	6.70c
No. 27	6.85c
No. 28	7.00c
No. 30	7.50c

No. 28, 36 in. wide, 20c. higher.

Corrugated Roofing, Galvanized

2½ in. corrugations, 10c. per 100 lb. over flat sheets.

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER

Bright basic	5.50c
Annealed soft	5.50c
Galvanized annealed	6.25c
Coppered basic	6.25c
Tinned soft bessemer	7.50c

*Regular extras for lighter gages.

Brass Tubes, Rods and Wire, and Copper Tubes

Manufacturers have withdrawn all quotations because of unsettled prices of raw materials and will only name prices to actual buyers.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 22½c. to 24½c. per lb.

Cold rolled, 14 oz. and heavier, 1c. per lb. advance over hot rolled.

Polished, 20 in. wide and under, 1c. per sq. ft. extra over 20 in. wide, 2c. per sq. ft. extra.

Planished copper, 1c. per sq. ft. more than polished.

Tinning, one side, 6c. per sq. ft.

Tin Plates

Bright Tin		Coke—14x20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$8.70	$8.45
			90 lb.	8.80	8.55
			100 lb.	8.90	8.65
IC	$11.65	$10.40	IC	9.15	8.90
IX	13.85	12.35	IX	10.30	10.05
IXX	15.60	14.10	IXX	11.45	11.20
IXXX	17.35	15.85	IXXX	12.60	12.35
IXXXX	19.10	17.60	IXXXX	13.75	13.50

Terne Plates

8-Lb. Coating 14x20

100 lb.	$8.80
IC	9.00
IX	10.00

Tin

Straits pig	74c to 75c
Bar	85c to 90c

Copper

Lake Ingot	16½c to 18c
Electrolytic	16½c to 18c
Casting	16½c to 18c

Spelter and Sheet Zinc

Western spelter	10c to 11c
Sheet zinc, No. 9 base, casks	12c; open 13c

Lead and Solder*

American pig lead	6½ to 7c
Bar lead	7½c to 8½c
Solder ½ & ½ guaranteed	45c
No. 1 solder	40c
Refined solder	34c

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	90c
Commercial grade, per lb	50c

Antimony

Asiatic	10c to 11c

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting (carload lots), f.o.b. mill, per lb	33.10c
In small lots	38c to 40c

Old Metals

There is no change in the general situation. Dealers' buying prices are nominally as follows:

	Cents Per lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	12.00
Copper, light and bottoms	10.50
Brass, heavy	7.50
Brass, light	6.00
Heavy machine composition	12.50
No. 1 yellow rod brass turnings	7.00
No. 1 red brass or composition turnings	10.00
Lead, heavy	4.25
Lead, tea	3.50
Zinc	4.50